

QUITO TO BOGOTÁ

A·C·VEATCH



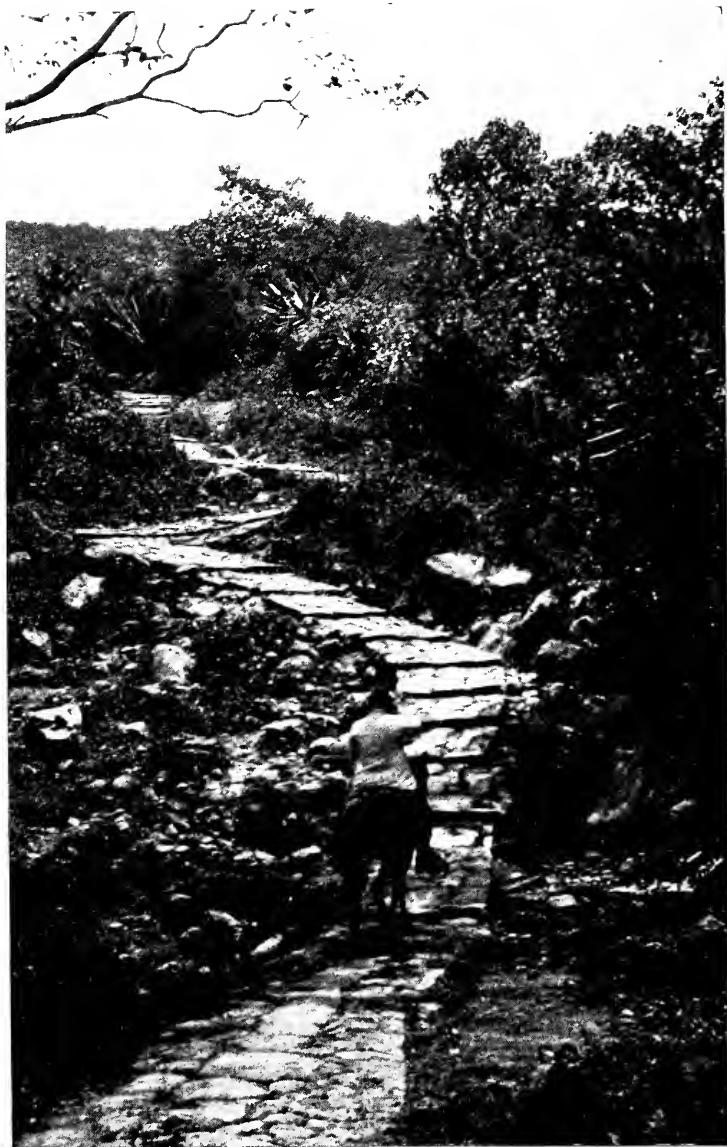
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STAIRWAY ON A PAVED TRAIL

A characteristic portion of the old Spanish trails in the neighborhood of Bogotá

QUITO TO BOGOTÁ

BY

A. C. VEATCH

F.G.S.A., F.G.S., F.R.G.S., F.A.G.S., ETC.

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"GEOGRAPHY AND GEOLOGY OF SOUTHWESTERN WYOMING," ETC.

WITH AN INTRODUCTION BY

THE RT. HON. LORD MURRAY OF ELIBANK, P. C.



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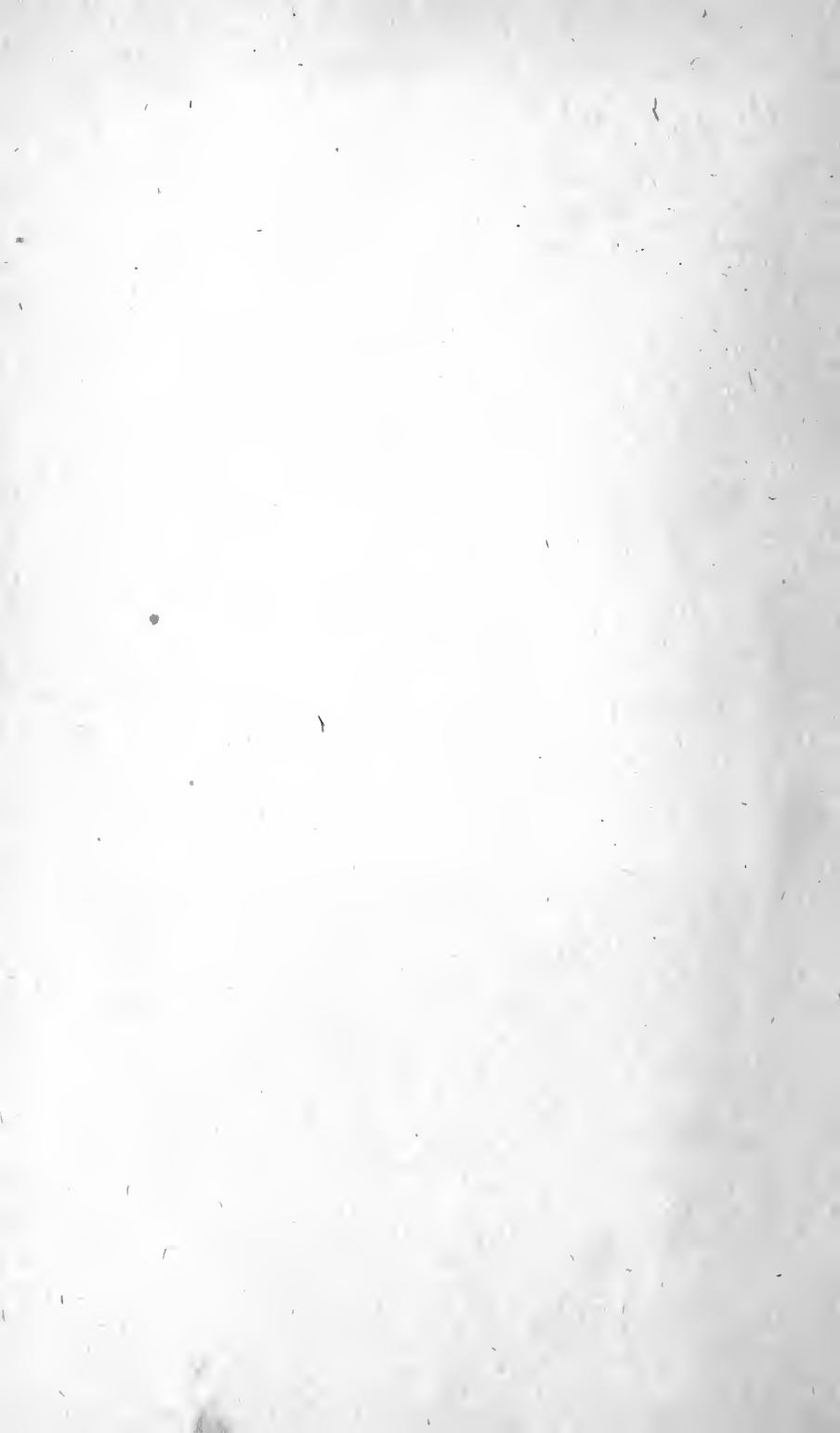
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DEDICATED TO
THEIR EXCELLENCIES
SEÑOR DON CARLOS E. RESTREPO
AND
SEÑOR DON L. PLAZA G.
PRESIDENTS OF COLOMBIA AND ECUADOR
AT THE TIME OF OUR VISIT
IN
GRATEFUL REMEMBRANCE
OF THEIR MANY KINDNESSES TO US.





LORD MURRAY (right), AND THE BRITISH MINISTER TO COLOMBIA,
MR. PERCY WYNDHAM, IN THE PATIO AT LAS PALMAS, FUSAGASUGÁ

INTRODUCTION

I gladly respond to the request of my friend Dr. Veatch to preface with an introductory note the absorbing pages in which he has richly elaborated his diaries of a journey we made together through the Republics of Ecuador and Colombia, the grandeur of whose scenery has for ever impressed itself upon my mind. I am not without hope that these pages will prove of interest not only to geologists, geographers, lovers of scenery and nature, but to that portion of the reading public to whom journeyings in little travelled countries peculiarly appeal.

Of the books that have been written on Colombia and Ecuador, countries glowing with the memories of the sixteenth century Spanish Conquistadores, I do not remember any containing so vivid a picture as that portrayed by the graphic and sympathetic pen of my fellow traveller. In commending this book to the British and American publics, and with respectful diffidence to Colombian and Ecuadorian friends also, there is but little to add.

For those interested in all pertaining to the old Spanish Main, the adventures of the Conquistadores and the British sea rovers, there is a new viewpoint in the adjustment to geographical facts of both new and old historical data, rectifying long current misconceptions. Starting from Quito the reader is taken through the upland parks of the Andes, traverses the famous fertile, healthy plains between

the Central and Western Cordilleras, descends to the Pacific at Buenaventura, and returning, climbs over the three ranges, and finally descends to the northern shore of the South American Continent, along the valley of the Magdalena. It is a region with an old civilisation and culture, a country of great natural resources, but comparatively few people—little known to the English speaking world.

Colombia embraces an extent of area greater than the sum total of the following European countries: France, Belgium, Holland, Germany and Switzerland. It is the most northwestern of the Republics of South America, and the one nearest the Panama Canal. Often regarded as a rain-drenched, unhealthy, tropical country, it has, in fact, a great diversity of climate, great agricultural possibilities, and enormous undeveloped mineral resources, and the day of great prosperity for Colombia is undoubtedly rapidly approaching.

Benjamin Kidd, in his "Social Evolution," observes:—"The day is probably not far distant when, with the advance that science is making, we shall recognise that it is in the tropics and not in the temperate zones that we have the greatest food producing and material producing regions of the earth." When that great thinker penned these words, even he could have realised but little what a wonderful stride toward the accomplishment of his prophecy would be made by the marvellous achievements of the alert genius and resources of American engineers and doctors in their twin triumphs over nature and disease on the tropical Isthmus of Panama.

It has been my privilege on three or four occasions both prior and subsequent to the completion of the Canal to

visit Panama and for myself to learn the truth of what triumphant science can accomplish. American citizens must indeed be proud of the men who have carried out on the Isthmus their heart-stirring work in the interests of mankind. If I quote the work of the Americans on the Isthmus of Panama it is merely to bring home more particularly to my Colombian friends, the influence which the work of the Canal corps will have in placing the tropics among the most productive regions of the earth as the home of mankind. The achievements on the Canal Zone not only have robbed the tropics of its terrors, but have provided a clear and conclusive demonstration of what can be accomplished. The effect is thus world-wide, but the lands which will probably most benefit by this demonstration of life, comfort and health in tropical environment, are the neighbouring Republics of Central and South America. The benefit to these of harnessing science to similar ends will be incalculable, and with the construction of trunk lines and adequate harbour facilities, these nations will take the place among the nations of the world to which their great and indisputable natural resources, both agricultural and mineral, as well as the culture and courtesy of their peoples, justly entitle them.

To-day their small population is concentrated largely in the higher regions, where the elevation gives a climate like that of the temperate zones, but the development is hampered by the lack of trunk railways to which I have already alluded, like those which gave the mountain regions of Canada and the United States their present thriving condition and prosperity. These trunk railways and the opening up of the scarcely touched min-

eral wealth will come with the realisation that their extensive low-lying, thinly populated and meagrely developed tropical portions are habitable.

The triumphs of the Americans on the Canal Zone have shown the soundness of the observations of the economist, Kidd, that the day is indeed not far distant when, with the progress of science, we will realise that in the tropics and not in the temperate zones we have the regions which promise most to mankind in the future. This advance can only be made with great expenditure of money. Only State enterprise or organisations with large resources, alone or in partnership with the State, can in these early stages bring success one step nearer the prediction of Kidd. After the path is broken by the pioneers others will follow and the development of these regions will be accomplished without undue danger to human life.

A year or two ago I read an interesting article in the American magazine, the "World's Work," by Mr. Charles Chandler, of the American Consular Service, entitled "The World's Race for the Rich South American Trade," the gist of which is well worthy of the attention of the rulers of the Northern South-American Republics. Competition between the United States and Europe for sound commercial business with these States is largely handicapped by lack of banking facilities, by meagre sources of credible news, by an inadequate knowledge of conditions, and by misdirected training of trade representatives.

In both the Americas I had many conversations with prominent leaders and men of affairs, and they all agreed that the opening of the Panama Canal, together with the immense advertisement which will result in Europe, stimu-

lated by the great shipping companies desirous of steerage passengers, will bring a continuous flow of the best type of immigrant from Southern Europe to the Pacific ports in the South and to California in the North. It is interesting to note that that view is confirmed by Mr. Chandler. He writes, "The Panama Canal is viewed by Americans almost wholly as a channel of commerce for wares, but vessels carry more than wares. In their steerage are future nations. The Panama Canal is certain to provide one of the greatest channels of immigration in the world. Now South America is still a country for settlement as well as development. Only after a person has roamed over that vast territory from Panama to South Argentina, does he realise the sparseness of its settlement and the many possibilities of its future. Therefore the greatest advantage of the Canal is the people it will bring. They will amalgamate with the present inhabitants of the country and build a generally altered, perhaps a new, South America, industrially and politically. The change has begun in one country already. Argentina's commerce has grown, until that country has the largest foreign trade in the Western Hemisphere (except the United States). Argentina has received most of the immigration because of her railway and harbour development and the steamship lines from her ports to Europe, the remainder of it has only gone to Peru and Chile. Now the Panama Canal will bring the steamship lines to the west coast."

I sometimes think that the exhaustion that will come over Europe after the War will drive her inhabitants in tens and hundreds of thousands to seek new homes in those parts of South America where the development of trans-

portation facilities has prepared the way for the populations necessary for the working of their rich natural products. Immigration to South America not only will provide a steadying influence politically upon Governments but a quickening inspiration of the industrial life of the Republics.

The conclusions set forth in this volume formed the subject of many conversations and joint observations. Of all the peoples I know, it is no exaggeration to say that the Colombians as a nation are the shyest, and this is due primarily to the relative isolation of the centres of population as regards modern means of transportation.

In point of view of locomotion, the country is little in advance of the days when Sir Francis Drake appeared with his ships outside the walled city of Cartagena—a few jerk-water railways of short distances—coming from nowhere and going nowhere. The one railway of any consequence from Buenaventura on the Pacific has been built at extravagant cost, and there is no settled policy as to its ultimate extension.

Dr. Veatch touches, as is inevitable, on the necessity for trunk railways, and he points to the amazing example of the United States, where remote cities have been linked together, where government has been made secure, where a vast nation has been welded together, where interests which were once diverse have been made as one, and whence national well-being and prosperity have sprung. The monumental rise of the United States in strength and prestige may be summed up in the one word "Railways."

The Civil War in America showed to the people of that country how necessary through railway communication was to the well-being and peace of the nation. It was during

this struggle that the project of building great trunk railways across the western plains and mountains reached fruition. California and her sister states and territories were distant from the seat of government, mails were subject to many delays, communication was slow and uncertain, and the Government successively granted land to aid in the construction of three great trunk lines, one roughly near the centre of the country, one in the north and one in the south.

These railways were built across very sparsely settled regions—areas in which there was not sufficient population to support a railway—and the ultimate success of the roads built depended in large measure on the settlement and development of the areas through which they passed. For it must be borne in mind that there are two general types of railway ventures: (1) the railway built in a well-populated region where the demands of the people already there make it at once a profitable business, and (2) the railway built through a thinly populated region, which can hope to be a profitable venture only by the increase in the population and industries of the region served. In the one case the investor is assured of a reasonably speedy return on his money, while in the other he must wait. In one instance the railway serves an existing population and demand, in the other it must create both a population and a demand commensurate with the cost of the undertaking. To the first class belong the majority of the railways in Europe and the Eastern United States, to the second belong most of the railways in new countries, notably the first lines across Western America above referred to. When the ultimate success of these great trunk lines was assured Canada

adopted the same plan to secure a great trunk line—the Canadian Pacific—to the Pacific Coast. These through lines involved enormous expenditure—expenditure which had to await the development of the country before there could be any return.

Again, under the organised and benevolent guidance of the United States Government, through the creation of agricultural departments and experimental stations, the public-land States have become the most progressive and prosperous in the world. All these activities have been followed by an immense influx of capital and people. Everything, in short, is possible to a vast country developed on the Canadian and American plans.

Dr. Veatch's chapters provide instructive reading as to the temperate altitudes in Colombia, where cattle raising and cold-storage operations might be carried out on a vast scale. Development on these lines can only be effectually handled by a systematised scheme for placing on the soil by means of an immigration bureau the best types of European families, and subsequently by friendly nursing, guidance and protection at the hands of a benevolent Government.

The rapid and amazing economic growth of Argentina under the inspiration of enlightened rulers who realise that in commercial pursuits are bound up peace, prosperity and national consolidation, is convincing proof that this great sub-continent of America is wise to seek outside co-operation in the development of her illimitable resources. Capital bears no hall-mark or certificate of origin. Britain's wealth is due to what may be described as her "policy of the open door," through which has passed into her industries capital

from all sources, and it has resulted in the enrichment of her people, and the betterment of the professional and working classes of the country.

For the moment the European War lays a retarding hand on the expansion of Colombia, as it does on other young and ambitious nations, but if I might offer a respectful suggestion to the rulers of Colombia and Ecuador, who one and all showed us unexampled courtesy, hospitality and kindness, which I shall always recall with gratitude, it would be that they should use this unhappy interval in preparing careful plans for the future development of their rich and attractive countries. And finally, in the permanent interests of the Western Hemisphere, I would urge them to encourage warm reciprocal relations with North America, which, owing to its propinquity, must not only be always one of the principal remunerative outlets of their foreign trade, but a quickening example of what pertinacity and resource can achieve.

M.

Elibank,
Scotland.

February 1st, 1917.

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ONE

QUITO TO SAN PABLO



QUITO TO BOGOTÁ

*Hacienda Cusin,
Near San Pablo,
Province of Imbabura,
Ecuador.*

3rd July, 1913.

ONE could hardly imagine a more fitting place than the Hacienda Cusin at which to prepare the first of the series of narratives that, from time to time as opportunity affords, we plan to write concerning our journey through the Andes from Quito to Bogotá. The Hacienda Cusin is in one of the World's wonder spots! Although situated only 12 miles north of the Equator, it is a region of temperate climate, with the food products of the temperate zone, but here there are no long hot summer days, and no winters with frost and snow. In London and New York at this time of the year the heat is becoming oppressive; many have already left for cooler regions, and others are planning to go: here on the Equator the day has been delightful, the temperature neither too hot nor too cold, and it will be the same next month, that month most dreaded in the cities of the temperate zone.

No snow falls at the Hacienda Cusin, and there are no frosts to kill the summer gardens, but one has only to climb the nearby minor volcanic peak, from which the Hacienda takes its name, to see on a clear day the regions of perpetual

snow. A few miles away to the eastward is the gigantic snow and glacier-covered cone of the old volcano Cayambe, whose summit is over 19,000 feet above sea level; while along the same eastern side of the complex top of the Andes are successively to the southward the snow-covered peaks of Saraucú, Antisana (18,900), Sincholagua, and Cotapaxi (19,500). Along the western side of the Andes is the nearby snow-capped Cotacachi (16,300), the more distant twin Pichincha peaks (15,700), near Quito, as well as Corazón (15,600), and Iliniza (17,400) farther to the south. These snow-capped mountains are the culminating points in the great broad single mountain mass which here forms the Andes. Its top is from 20 to 40 miles wide and the parallel rims are generally called the "Eastern Cordillera" and the "Western Cordillera" respectively. Cross-ranges divide the top into a number of great elevated basins or mountain-parks which have a mean elevation of 7,500 to 9,000 feet, while their bordering rims have average heights of 11,000 to 12,000. These high basins are drained by rivers flowing through the ramparts, in some cases to the west into the Pacific, and in others to the east into the Amazon and the Atlantic. The Cerro Cusin (13,160) near the Hacienda is about midway between the eastern and western rims, and on a north-lying spur of the Paramo de Mojanda, which is the cross-ridge that separates the Ibarra mountain-park area, in which we are stopping for the moment, from the Quito mountain-park area through which we have just come, and in which we have spent many pleasant days in the past five weeks.

Both the Ibarra and Quito mountain-parks drain into the Pacific, the former through the gorge of the Mira and the

latter through the gorge of the Guailabamba, both cut through the Western Cordillera. On the other hand the mountain-park area of Latacunga, which is the one south of Quito, has its river outlet through the Eastern Cordillera into the Amazon.

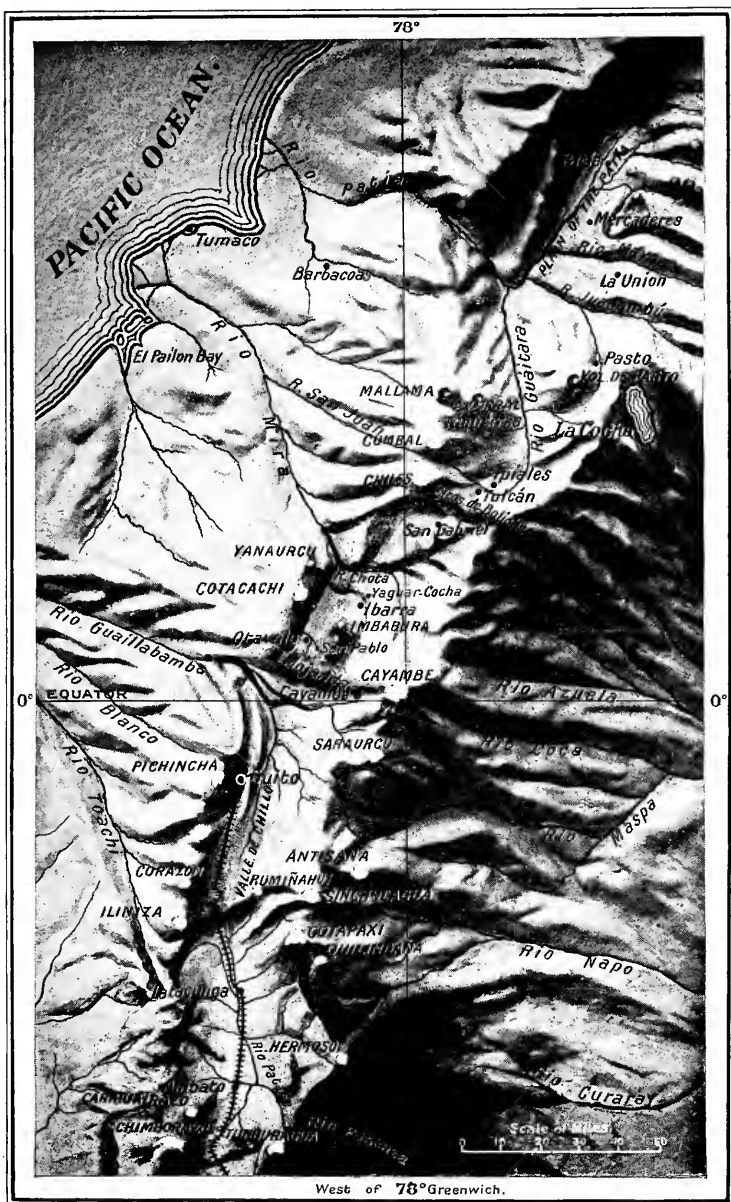
The Andes in Ecuador slope very steeply towards the Pacific on the west and the low-lying Amazon drainage on the east, and the streams that flow from the mountain-parks therefore have very steep gradients. Because of this and the steady supply of water from the adjoining mountain-top paramo regions, the streams have made much progress in trenching these basins. In those portions of the parks most distant from the point of outlet through the mountains this trenching is slight, but as the outlet is approached the depth of the cut in the floor made by the stream increases very rapidly, and in the case of the Guailabamba, which we crossed only a few days ago in coming from Quito, near the point where it passes through the western range, the total depth of the cutting of the stream is over 3,000 feet, of which over 1,200 feet is in the form of a steep-sided narrow canyon. The mountain-parks of Ecuador are thus not only separated from each other by cross-ranges of only a slightly less altitude than the Eastern and Western rims, and contain minor ridges and peaks like that of Cerro Cusin, but near their water outlets are also broken by very deep valleys.

These mountain-parks have a gentle rainfall; in places sufficient for ordinary crops, but in others requiring to be supplemented by irrigation, for which the mountain streams furnish an abundant supply, and in this respect contrast markedly with the outer slopes to the east and west, which at the same elevation as the floors of the mountain-parks,

that is, 8,000 to 9,000 feet, are deluged with rain and are covered with luxuriant vegetation dripping with moisture. This heavy rainfall quite reaches the coast in northern Ecuador, but extends only partly down the western slope in central and southern Ecuador, where the winds from the Pacific are not heavily charged with moisture, and pass over the coastal belt without yielding heavy rains. It is only when they are forced to ascend the mountains that the increasing cold of elevation causes great precipitation. On the other hand the winds from the Amazon are charged with moisture, and the whole eastern slope is reported as dripping with water from top to bottom—the only changes being an increase in heat as the lower levels are approached and the gradual alteration of the floral aspect of the jungle forest.

On these mountains the tree growth becomes very stunted above an elevation of 10,000 to 11,000 feet, quantities of moss and other bog-loving plants appear, and the greater part of those mountain tops which are below the snow-line are covered with a thick layer of water-soaked partially decayed bog vegetation. These are the “paramos” of the Andes, unpleasantly cold and enshrouded in an almost perpetual mist. Those who are unfortunate enough to wander from the trail suffer much from the cold and almost impassable nature of the ground. We have a very vivid recollection of a night spent on the Paramo of Mojanda across which we passed in coming here from Quito.

The Paramos cover not only the outer slopes of the Andes above 10,000 to 11,000 feet, but also the slopes of the rims towards the mountain-parks, as well as the cross-ranges which separate them. Below the paramo zone the mountain-parks may be said to be in the “rain-shadows” cast by



MOUNTAIN PARKS OF NORTHERN ECUADOR AND SOUTHERN COLOMBIA
(After Rosales, Wolf, and others)

these bordering ranges, as winds coming from the east or the west are by their forced passage over the elevations on either side robbed of most of their moisture, and it thus happens that the park areas themselves are regions of gentle rainfall.

These greatly blessed elevated basins, with a thick, rich volcanic soil, were occupied by Indian Tribes who had progressed much beyond the status of the simple savage at the time this country was conquered by the Spaniards. On the other hand, in the Amazon region the tribes were, as they are to-day, in a very primitive state, while those on the coast, from which region these mountain people had come, at least in part, though more advanced than the Amazon tribes, were handicapped by the enervating heat of the coastal region and by the eternal struggle with malaria. Certainly at the time when the Spaniards arrived those cultured aborigines, who have left many remains of their civilisation in this coastal region, had virtually disappeared, and in their place there were savages of whom it is recorded that they were regarded by one of the late Inca rulers as not worthy of even an effort to civilise!

The Spaniards were originally but a handful compared with the numbers of these mountain people, and even to-day it is stated that the Indians still form the greater part of the population of the northern mountain provinces of Ecuador. As far as we have had an opportunity of observing them, these Indians appear a most industrious, docile, sturdy, rather shy people. One cannot but be impressed with the marked Asiatic cast of their countenance and general physique.

The Hacienda Cusin includes much land approaching the

paramo zone, which is suitable for cattle raising, and for which it is, indeed, largely utilised, but one has only to look to the north, from our comfortable quarters, to see an almost countless number of small fields extending well up the sides of the mountain, all subjected to intensive cultivation by the Indians.

The Hacienda Cusin is situated in the extreme southern end of the Ibarra mountain-park at an elevation of about 9,000 feet. The house itself is of the Spanish villa type—a one-storied, red-tile-roofed building with an encircling verandah, floored and walled with the type of tiles which the Moors at an early date introduced into Spanish architecture. In front is a delightful old-world garden, beyond which is the beautiful little Lake of San Pablo (8,850 feet above the level of the sea), rivalling in the blueness of its waters and the beauty of the surrounding country the lakes of northern Italy, and between the house and the lake is the little village of San Pablo with its three white Church towers, a veritable bit of old Spain itself.

One does not see any of the snow-peaks from the house, but one gets a glimpse of the old volcano of Imbabura (about 8 miles to the north and on the same ridge as the Cerro Cusin), which still has some snow on its summit this time of the year, although I am told that it is not always so covered. The lake is dominated on the eastern side by the rugged rocky slopes of Cerro Cuvilche (12,730 feet), Cerro Cochaloma (11,450 feet) and Cerro Cunru (10,950 feet), other old minor volcanic peaks, lying just north of Cerro Cusin, and on the western side by a rather gently sloping spur of the cross-range, beyond which to the northwest, and quite out of sight in an adjoining valley, is the town of

Otavalo, of pleasant memories. The Hacienda Cusin is but one of the many centres of Spanish culture which are to be found throughout Ecuador. It is the homestead of one of the old aristocratic families, and its present owner is Madame Lasso, the mother-in-law of the President of the Republic.

It is just ten days since we decided to return overland to Bogotá. Lord Murray had never tried riding on a mountain trail, but his pleasant recollections of a trip by ox-wagon in Matabeleland, some twenty years before, caused him to look forward to the adventures of the journey with keen anticipation. The feeling in Quito is very strong that Lord Murray will not succeed in making the overland trip to Bogotá, and the betting in the Clubs of the city are long odds against his doing so, as even among these horse-loving folk this journey is to-day of rare occurrence.

It was decided that, while it was best to purchase our saddle animals, it was on the whole advisable to hire a pack-train. With respect to the latter, we found that in these regions where all supplies must be so transported, there were naturally people who made this their occupation and that it was a business of individuals rather than an organised transportation controlled by one or more large companies. This has been the method of transportation in this country for centuries, and naturally there are stopping-places commonly recognised as marking the limits of a day's journey. Certain groups of men work between certain places, and they seldom pass beyond what they consider their own particular beat. This is quite natural, as the continued and successful operation of this service requires that those conducting it have business connections with some of

the merchants in the cities which mark the termini of their rounds. In each pack-train there is commonly from six to twenty animals, which are usually accompanied by the owner or the owners of the animals and one or two helpers—all indiscriminately called "arrieros." We consulted some of the merchants of Quito and found that there is a considerable trade between Quito and Tulcán, which is the northernmost Andean town of Ecuador, and that we could readily arrange for the transportation of our baggage to the latter place. This is regarded as a five- to six-day journey and is officially stated to be 133 miles by the trails ordinarily followed. As we did not plan to stop at the usual recognised halts, and as parts of our equipment were quite different from the packages of merchandise usually carried, several new factors were therefore introduced into the settlement of the terms of compensation.

In conducting these negotiations we formed the impression, and we gathered that it is commonly the case, that the compensation to those who engage in this business consists as much in the enjoyment and entertainment they derive from bartering with the prospective customer as in the actual money received. There is the size of the loads, the number of animals required, whether the owner of the pack train is to ride or walk, the proportion of the wages to be paid in advance, and many other details, which though fairly well settled by custom may still be brought forward as subjects for bargaining.

There is a considerable amount of trade between Tulcán and Pasto, and there would be, we were informed, no difficulty in getting transportation for this stage of the journey. Between Pasto and Popayán the matter did not appear so



AN ECUADORIAN HACIENDA GARDEN

Hacienda Cusin near San Pablo, 7,900 feet above sea-level



simple. Pasto receives its supplies either from Quito through Tulcán or from the Port of Tumaco, on the Colombian coast. Popayán on the other hand receives its supplies and trades almost exclusively with Cali, and there is thus very little trading between Pasto and Popayán (a seven- to eight-day journey), and consequently very few arrieros work between these two places. However, by telegraphing to Pasto we found that arrangements could be made. Beyond Popayán we were assured there would be no trouble, for there is much trade between Popayán and Cali, the head of navigation on the upper reaches of the Cauca River, and between Cartago at the foot of the upper Cauca navigation and Girardot, the terminus of the railway from the Magdalena River to Bogotá. We also learned, in case we should decide to follow the more direct route and not go through the Cauca valley, that some arrieros work direct from Popayán to the Magdalena River.

We arranged for pack animals to make the trip from Quito to Tulcán, that is, across the Quito mountain-park, and through the Ibarra mountain-park into the southern edge of the mountain-park of Tulcán-Túquerres. There are two routes usually followed from Quito to Tulcán, the more direct one passing across the canyon portion of the Guailbamba and the Paramo of Mojanda to Otavalo, and thence through Ibarra to Tulcán; and the other, a much longer one, by way of the village of Cayambe, which lies at the foot of the old snow-covered volcanic peak of that name. At some times of the year a part of the direct trail across the Paramo of Mojanda is so wet, and cut into almost bottomless mud-holes, that it is virtually impassable, and then the Cayambe route is followed. This route circles the head-waters of

tributaries of the Guailabamba where they have not deeply trenched the mountain-park and passes through a very low place in the Mojanda cross-range, below the paramo level, to San Pablo and thence through Ibarra, and is much more horizontal than the direct road. There is also another route from Cayambe to Ibarra across the Paramo of Pesillo, but when the Mojanda route is impassable this is in a like condition.

We were advised by a recent arrival from Otavalo that in passing over the direct Mojanda route but a short time before, he had found it in quite good condition. We decided therefore to take this route, and while the fact that we are now here at the Hacienda Cusin clearly demonstrates that it was "passable," it happened that immediately after our informant had passed over this route, a slow, steady, long-continued rain began and we consequently will remember the passage across the Paramo of Mojanda for many a day.

This route over the Mojanda Paramo follows what apparently was once a carefully made cart road, the construction of which must have been undertaken many years ago, as the wagon bridges are now in ruins and the road quite impassable for carts, even in dry weather. Whether it was ever used extensively for wagon traffic is very doubtful, for, although it started at Otavalo, it did not pass across the canyon of the Guailabamba and so never furnished any connection with Quito, which is the natural market and source of supplies for this region. The passage of the Guailabamba by a wagon road along this route would involve a number of engineering difficulties and a considerable expenditure, and as the modern highways are gradually constructed in this country, one would expect the first connect-

ing Otavalo and Quito to pass through San Pablo and the low gap in the cross-range, already described, to Cayambe and thence to Quito.

There has been some progress made in modern highway construction in the neighbourhood of Quito, but the road leading south from the city is the only one which goes any considerable distance. Before the railway running southward to Guayaquil was completed stage-coaches ran along this road connecting the capital with the semi-populous mountain-parks to the south. The three other modern highways have been completed for distances of only 10 to 15 miles. The two going to the eastward (one to the southeast through Conocoto to Sangolquí and the other northeast through Guápulo to Tumbaco) are notable pieces of road-engineering. In particular the one to the southeast would do credit to those master-builders of mountain roads, the French. It first climbs 2,000 feet to the summit of the Poingasí ridge, which is a minor north-south ridge within the Quito mountain-park area, and then descends in long winding curves 3,000 feet to the beautiful irrigated Chillo valley in which Conocoto and Sangolquí are situated.

Considering the small extent of modern highways, one is astonished in Quito, as in Bogotá, where the conditions are much the same, at the great number of automobiles, and when we had time only for a short motor trip the answer to the question of where shall we go was always: "To the top of Poingasí to have another look at Quito." This view of the city is the most satisfying and comprehensive we succeeded in obtaining in our little journeys in the environs of the capital during our five weeks' sojourn there.

Quito is situated in the narrow valley between the Poin-

gasí ridge and the Western Cordillera. The town extends a little way up the slopes of the western range, on the one hand, and at the railroad station touches the lower slopes of the Poingasí ridge. The twin peaks of Pichincha, snow-covered most of the year, tower 6,000 feet above it to the west, and the Poingasí ridge rises 2,000 feet to the east. The valley is interrupted to the south by the steep-sided, conical hill, almost artificial in aspect, called the Panecillo, on the top of which in the days before the Spanish conquest stood the native Temple to the Sun. Quito is thus virtually a city in a pocket in the mountains, and one must ascend the hills on either side to obtain any comprehensive view of the surrounding country.

From Poingasí ridge one finds Quito a most interesting and attractive white-walled, red-roofed, church-towered city in a rolling sea of green, without trees, except scattered clumps of alien eucalyptus, the gift of Australia to the world. The valley in which the city is situated is, because of its elevation—9,350 feet above sea level—more suited for cattle raising than for agriculture, and many have wondered why this ancient capital of the Cara-Shiris and the Incas should have been established here rather than in the nearby, broad, fertile, beautiful, more temperate, agricultural Chillo valley, which is just sufficiently lower to take the slight chill out of the air which one finds at Quito.

It is related that it was at Quito itself that the Spaniards first became acquainted with the cultivated variety of potato, which the Indians had developed from the wild native species. Soon after the Spaniards introduced this new vegetable into Europe it reached Ireland, and now, strangely

enough, it is most commonly known in English-speaking countries throughout the world as the "Irish potato."

Quito was, in the days before the Spaniards, the native capital of a territory very nearly co-extensive with the present limits of Ecuador. It became the capital of the Spanish Province and then of the Republic. It is between 9,100 and 9,500 feet above sea level, and, with the present population of about 80,000, vies with Guayaquil in being the largest town in Ecuador.

The modern road which extends north from Quito follows this little valley between the Western Cordillera and the lower northward extension of the Poingasí range. It passes through Cotacollao and Pomasqui to San Antonio, a distance of 16 miles, but during our stay in Quito one of the bridges between Pomasqui and San Antonio was out of repair, and we did not succeed in going by motor further than Pomasquí, a distance of 13 miles, along this good road.

It is considered to be a two days' journey for a pack-train from Quito to Otavalo, a distance of about 50 miles, and when the roads are in good condition one accustomed to riding and mounted on a good horse or mule can ride from Otavalo to Quito in a long day, and it is sometimes done, but when the roads are in bad condition it is quite another matter, and even at best the rider must be a good one and the animal speedy and sure.

Saddle mules are generally preferred to horses for traveling on mountain trails in Ecuador, because of their greater sure-footedness and their toughness, and to judge from all accounts we had secured the most famous saddle-gaited mules of the country. President Plaza had most courteously

sent his own favourite white saddle-mule for Lord Murray's personal use as far as the boundary of Ecuador.

On Tuesday, the first day of July, at 7 a. m., after a last look at the great drawing-room with its Parisian furnishings, a last breakfast in the delightful flower-encircled dining-room, in the very heart of the house, between the two patios or courtyard gardens, we left the Casa Bonifaz, and motored rapidly through the streets of Quito, down the hill past the Church of San Agustin to the Plaza of the Theatre and then up again past the houses of the British Minister and the Colombian Minister, near the beautiful park of the Alameda, and out upon the north road—the “Carretera Nacional del Norte.”

The North Road is very nearly level as far as Cotacollao (9,200 feet), a distance of seven miles. It follows along the foot of the eastern slope of the Western Cordillera and is flanked by a belt of flat land about a mile wide. This high level, although but the northward extension of the Quito level, here assumes the aspect of a high terrace rather than a valley as at Quito, but it is all one feature and represents the first or high level of the Quito mountain-park. Its general relation to the other features of this park may be grasped by considering a profile extending from the crest of the Western to that of the Eastern Cordillera. There is first the steep eastern slope of the Western Cordillera, then this flat bench, a mile or two wide, of a mean elevation of something like 9,300 feet (9,000 to 9,600), then a steep slope to the level of the wider plain, which is the extension of the Chillo and Tumbaco plains, somewhat trenched by the streams crossing it and with a mean elevation of about 8,300 feet representing the second or middle level of the moun-



Showing the general location of the city in a narrow valley in the mountains, with the extinct volcano of Pichincha in the background. Quito is 9,350 feet above sea-level and the highest point of Pichincha 15,700



A portion of the city

VIEWS OF QUITO

tain-park, beyond which there is a similar sharp rise of 1,000 feet to the eastern representative of the high level 9,300-foot bench in the region of Cayambe and then a steep up-slope to the crest of the Eastern Cordillera.

This first or high level bench extends along the western edge of the mountain-basin from Cotocollao through Quito to Tambillo and Machachi, a distance of 30 miles. The hard rocks of the Poingasí ridge have prevented its destruction by the waters of the Machángara stream at Quito and by the Rio Machachi in the region of the place of that name. Remnants of this first or high level are also found on the eastern edge of the park around Cayambe and on its northern border along the south side of the Mojanda cross-ridge.

At Cotocollao we reached the headwaters of the Rio Pomasqui, and the road entering this drainage begins to descend rapidly. At first the high level bench shows on either side of the road, but as the stream valley grows wider it quite disappears, and after a descent of 1,000 feet we arrived at Pomasqui, near the beginning of the second or middle bench, and saw the flat lands of this level extending north to San Antonio and beyond.

The arrival of foreigners aroused much interest in the little town of Pomasqui. Several persons hurried forward offering to conduct us to our waiting animals, but when we reached our men we learned that the two mules which were to have been delivered at this place had not arrived. A bystander, with the courtesy characteristic of these people, offered to see what was the matter, and mounting his horse, disappeared in a cloud of dust round the corner, while we busied ourselves with the readjustment of saddles and equipment. After a time the two mules arrived and we

started north along the trail which follows the bench on the east side of the stream.

At first the Rio Pomasqui makes only a slight indentation in the plain, but as we go north cuts deeper and deeper and is soon in a gorge with the plain level high above it. The trail follows for some miles along this plain which, representing a portion of the 8,300-foot terrace of the mountain-park, is enclosed here by the Western Cordillera and the northern extension of the Poingasí ridge. We reached and crossed the Equator, and the Chilian Minister, who is riding with us to the frontier, indicated the exact point in the gap in the hills just back of San Antonio through which the line of the Equator was determined to pass by the French Scientific Equatorial Mission. San Antonio lies on the west side of the Rio Pomasqui in a wide and undissected portion of this gently sloping plain of the second level. About Quito everything was green, while here it is much dryer and cacti begin to appear along the trail; however, there are green fields around San Antonio, and in the bottom of the Pomasqui gorge we get glimpses of tiny little patches of irrigated land.

Immediately north of the Equator the Rio Pomasqui strikes the hills which bound the valley on the east, and here the plain level is entirely destroyed; and the trail is cut out of the rock and debris of the hillside, just a narrow track with the waters of the Pomasqui a thousand feet below. From here we caught glimpses of a very interesting modern bridge, with the roadway far above the stream, which connects the trail we are now travelling with San Antonio.

After a few miles we reach the edge of a steep escarpment and look down on the flat land of the third or last level of

the Quito mountain-park, which, over 1,000 feet below the level of San Antonio, has an elevation of slightly less than 7,000 feet, and is cut through the centre by the deep gorge of the Guailabamba. All three levels of the Quito mountain-park are gently sloping rather than absolutely plane surfaces, but they are rather sharply separated from each other, and although they vary somewhat in elevation, it will be convenient to think of them as the 7,000-foot, 8,000-foot and 9,000-foot levels. Of the three the middle is the most extensive and the lowest the smallest.

This lowest level is represented by terraces of limited extent along that portion of the Rio Guailabamba which is near its outlet from the mountain-park, and is perhaps best seen along the route we are now following. It is rather more arid than the second level and except where reclaimed by irrigation, is covered with characteristic arid vegetation.

From the top of the escarpment, above the Hacienda Providencia, we see many irrigated fields, to which we soon descend 900 feet by a very steep zigzag trail and pass into the courtyard under an arch made of sugar-cane decorated with bunches of oranges. It is a feast day of the Indians, who, fantastically dressed and under the leadership of one equipped with a gorgeous red umbrella, do a slow shuffling dance accompanied by the music of several three-stringed instruments somewhat like a guitar.

Leaving the Hacienda Providencia, we crossed the terrace and descended by a well-constructed trail 1,250 feet to the bridge across the Guailabamba. This stream is here in a narrow gorge that cuts through the volcanic material, forming almost the whole surface of the basin, into the older underlying sedimentary rocks, here rather metamorphosed.

The stream has a very steep gradient, and hard rock walls in many places offer most excellent dam sites that could be developed to yield an abundance of electric power, which will unquestionably be done when this region reaches the stage, as it will, when such power is required in large quantities.

It seems even dryer in the bottom of the canyon than on the Providencia bench, and this with the character of the vegetation on the middle level near San Antonio and Pomasqui, as well as on the upper level near Quito, suggests that the intensity of the rain-shadow cast by the surrounding mountains varies in different parts of the park inversely according to the depth below the level of the enclosing ranges. That is to say, the amount of rainfall received within the park gradually becomes greater the nearer we approach the paramo zone.

Beyond the bridge of the Guailabamba the trail zigzags up again to the 7,000-foot plain, which here, as at Providencia, has irrigated fields. On this side of the river there is a little collection of Indian huts called Alchipichi, beyond which the trail zigzags up 2,000 feet to an extensive area of flat land representing the upper or 9,000-foot level. The middle terrace is not represented on the north side of the river and the climb is therefore equal to the slope above the Providencia Ranch with the addition of that from Pomasqui to Cotocollao. The trail however follows a small tributary valley and the climb, though twice the height of that near Providencia, is not so steep. The upper level is about four miles wide where we crossed it in approaching the small group of adobe houses called Malchinguí (9,500 feet) situated at the foot of the mountain on the edge of the plain.

The country about it is extensively cultivated, and we saw large fields of excellent wheat just ripening, although the dominant crop is maize.

We stopped at the little inn and asked for food, but there was nothing left from the midday meal. They had plenty of meal, flour and meat and would be glad to prepare something for us, but a fire must first be made and it would take, say, two hours. In the opinion of the innkeeper it was much too late in the day to start for Otavalo, and really he thought we should stay with him for the night. However, if we could not wait he would give us what he had, which consisted of three small pieces of bread, some native cheese and bottles of the excellent beer made in Quito, and having consumed this, we continued our journey at 4 o'clock. As we came up the zigzag above Alchipichi, we had seen the rest of our party descending the zigzag above Providencia and knew that they were probably an hour behind us. Allowing for the stop we had made, we told the innkeeper that they would arrive in a short time and should be told to follow immediately. We learned afterwards that they arrived in half an hour and were informed that we had left instructions that they should stay the night there and proceed to Otavalo the next day!

Beyond Malchinguí the trail begins at once to climb the cross-range which separates the Quito from the Ibarra mountain-park and soon enters a region of low scrubby timber, indicating greater rainfall and the approach of the paramo level. It climbs the hills at a rather easy gradient, having originally been a carefully laid out and well-constructed cart road, and soon passing around a spur becomes

a notch hewn in the side of the mountain above a stream valley whose bottom is visible 2,000 to 3,000 feet below.

For some miles after leaving Malchinguí the trail is very good, but after a time we began to find mud-holes, particularly at those places where the road had been cut through little ridges and lay between banks rising from 5 to 15 feet on either side. At these places, because of the steepness of the slopes of the mountains and the tangle of paramo vegetation, it is virtually impossible to go around, and the constant traffic along this route has worn the trail into a series of cross-ridges. Each mule puts his foot in the same places as his predecessor and so cuts depressions with intervening ridges. The depressions hold the water and each passing mule churns the mud a little deeper. The drivers try to guide their animals to one side or the other of the central track, but the distance between steps is still the same and the ridges with their hollows in time extend entirely across the road. When these mud-filled hollows become 12 to 24 inches deep the poor animals have a hard time of it, even in daylight. After a time there are only hidden remnants of the ridges in a sea of mud, and when the animals stumble on these and fall into the mire, pack, saddle, rider and all, the trail is considered impassable!

We passed through a few places in the road which we thought were bad, and just about dusk came to a shelter where a number of pack-trains were spending the night. It was suggested that we stop here till morning, but the Chilean Minister, who had been over this trail several times, and whose method of measuring his position on a trail was, as we learned, not with reference to landmarks, but by the hours on the trail, said it was quite impossible to stay here,



Lord Murray and His Excellency Señor Eastman Cox, Chilian Minister to Ecuador, on the trail north of Pomasqui Ecuador, showing semi-arid vegetation of this portion of the Quito mountain-park.



The plain of San Antonio—trenched by the gorge of the Rio Pomasqui

that Otavalo was just around the next bend, and in 30 minutes at most we should see the lights of the city, and so we continued. It was now rather dark and we soon came to mud-holes, which convinced us that those we had seen before hardly deserved the name. The Chilian Minister would flounder through on his great horse, shouting warnings and directions, and then the rest would follow as best we could.

After several trials in which our animals narrowly escaped stumbling and falling flat in the mud, we tried stepping from ridge to ridge and leading our animals through, which we found very difficult, as the ridges were not only very sharp but wet and slippery. We tried going round in some places where others had done so before, but this was even worse than the mud-holes themselves. After a fall of one of us down a 12-foot bank this method was abandoned.

How we escaped serious accidents in these perilous places is the source of no little wonder to us, for when the rest of our party came through in daylight the next morning two members went down into the mud, when their animals fell, and one of the poor beasts so injured himself that he died here at the Hacienda Cusin to-day.

Interspersed with the mud-holes were bridges, just wide enough for one animal, crossing mountain ravines, which seemed on so dark a night to yawn to unfathomable depths, and our animals were very tired. We thought at least that they were arches of stone and so, though narrow, quite strong. However, the remainder of our party who saw them in daylight found them to be made of nothing but small logs covered with a little brushwood and earth and paved with stone, poor makeshifts for the wider bridges built when this trail was constructed as a cart road.

And so we went on hour after hour, floundering through mud-holes in the dark and trusting to the sagacity of our animals on the narrow bridges. From time to time a consultation was held and it was suggested that we stop and wait for daylight, but each time the response of the Chilean Minister was that Otavalo was just around the next bend, and in 15 to 20 minutes at most we would see the lights of the town, and each time, hoping that he was right, we struggled on. Finally, at 11 o'clock, and after four hours of precarious going in the dark, Lord Murray said that Otavalo was the most elusive city he had ever tried to reach and, for his part, he proposed to stop and spend the night on the very spot where he was standing. The Chilean Minister again gave the 15-minute promise, but the majority vote was to stop.

Fortunately there were two Indian saddle blankets on our animals and we each had ponchos. In addition there was a small tent on the Chilean Minister's extra horse. His two horses were great pals and each would follow the other without being led. The Minister wished to break them into packing, and when he rode one he placed a light pack on the one which followed. We spread one side of the tent on the surface of the road and pulled the other over us to keep off the cold paramo mist which we found very penetrating here at an elevation of over 12,000 feet. We tried to light a fire, but every dead bit of vegetation was filled with water to its very core and the attempt was abandoned.

Morning disclosed that our improvised camp site was within a few hundred feet of a most frightful series of mud-holes and that about half a mile beyond the road-grade led up to the abutments of a bridge across a moun-

tain stream, but that the bridge itself had been entirely carried away. Following this road-grade in the dark, we would most certainly have ridden straight into this chasm. In daylight we easily found the new trail, crossing the stream by a very devious rocky detour.

This camp was just over the crest of the range on the northern slope and within the crater of the old volcano of Mojanda, and we soon passed between the two little lakes that lie in the lowest part of the crater, which is almost three miles in diameter. A night in the crater of a volcano in the Andes of Ecuador has a rather romantic sound, and one would not expect to suffer from cold in such a situation, but the fires of this volcano have been dead for many, many ages, as man counts time, and the cold paramo was just the same as it would have been had this mountain been produced by other causes.

At daybreak we continued the descent along the constantly improving trail, and soon were met by a horseman, who told us that preparation had been made in Otavalo for our reception the night before, and so much concern was felt at our failure to arrive that men had slept along the road waiting us. He galloped off to announce that we were safe and well, and also to have the automobile, which is the pride of the town, meet us at the point on the road three miles from Otavalo which marks the limit of the portion that is still passable for carts. I understand this car is a Ford and that it had been brought in pieces from Quito over the mountain trail. But this day, with the utter depravity of inanimate things, it refused to run.

This old cart road across the Mojanda from Otavalo to Malchinguí stands as much a monument to the lofty am-

bitions and energy of those who were responsible for it as it does to their impracticability and want of judgment. Improvement in the means of transportation, particularly the construction of railways and cart roads, should be the slogan of all the people of this region, but it would seem that, in the present state of development of the country, the energy and money expended on a cart road from Otavalo to Malchinguí could have been utilised in directions which would have given more permanent and useful results. Owing to the lack of adequate means of communication, the development of this rich northland of Ecuador has apparently remained stationary for at least 50 years.

At 9 o'clock, when we were about three miles from the town, we were met by a delegation of gentlemen on horseback consisting of the Jefe Politico (District Governor), the Commandante of the detachment of troops stationed at Otavalo, a prominent lawyer of the town named Señor Doctor de la Torre, and other persons of importance. The Jefe Politico and the Commandante informed Lord Murray that the President of the Republic had specially instructed them to show every possible courtesy to him and his party. Dr. de la Torre stated that his friend Dr. Victor Manuel Penaherrera had wired him of our expected arrival. Doctor Penaherrera, of whom we saw much in Quito, as Lord Murray's legal adviser in his negotiations with the Ecuadorian Government, is one of Quito's noted lawyers, Professor in the Faculty of the Law School, and a man greatly admired for his ability and respected for his integrity. He is a native of Ibarra, which is the capital of the province of Imbabura, in which Otavalo is situated, and we found our high regard for him but echoed the senti-

ments with which his own people and neighbours of this north country regard him.

During an official breakfast the Regimental Band played in the courtyard, and at two o'clock we visited the Barracks, where the troops had been paraded in honour of Lord Murray and the Chilian Minister. After the inspection of troops, we mounted our animals and proceeded with a number of gentlemen, including two of the officers, along a modern highway across the low ridge which separates Otavalo from the Lake of San Pablo, and then along bridle-paths between the small plots of land belonging to the Indians, to a landing-stage on the shore of the lake. Here there was a large skiff, with a capacity of 8 to 10 persons, which was an object of local pride quite equal to that felt for the automobile; and well it might be, for this boat was brought from Guayaquil to San Pablo before the railway to Quito was begun. The labour of bringing so heavy and unwieldy an object the 325 miles involved in this journey, from the sea level up over mountain-passes 14,000 feet high, as on the old Guaranda-Mocha trail, is prodigious, and can be fully appreciated only by those whose pleasure or duty has carried them over the mountain-paths of the Andes.

There were several flocks of duck on the lake, and part of the entertainment offered was duck-shooting from this boat. As the equipment for this shooting expedition consisted of one shot-gun, one Winchester rifle, two Army rifles, and two automatic revolvers, some of them in the hands of very excitable sportsmen all ready to fire at the same time and in any direction, the shooting part of the day's entertainment was both amusing and exciting.

San Pablo Lake is about three miles long and about a mile wide, and is reported to be between 100 and 275 feet deep. Its depth suggests a crater lake, but the general aspect of the surrounding topography does not lend weight to this idea, but rather to the hypothesis that it was formed by the damming of a stream by volcanic debris. We rowed across the lake to a point near the village of San Pablo, where our saddle animals had been taken to await us, and, as there was no landing-stage here, each of the party was carried ashore on the back of a sturdy Indian. The ability of these Indians to pack weights of several hundred pounds over rough mountain trails is almost incredible. We rode through the little village of San Pablo up to the house of the Hacienda Cusin. In a field just west of the house we saw a number of truncated-pyramid mounds, which suggest that this was also a favourite spot of the former Indian rulers of this country; as well it might be!—There is the house itself, with its garden and the adjoining great stable-courtyard and buildings, the whole connected by high walls into a compact enclosure such as is seen in Spain and some of the older English manor houses.

To-day has been a quiet one with walks in the garden and on the neighbouring hills. Our packing has been overhauled and rearranged, and everything is ready for the resumption of our journey to-morrow.

TWO

SAN PABLO TO SAN GABRIEL

*Hacienda El Vínculo,
near San Gabriel,
Province of Carchi,
Ecuador.*

7th July, 1913.

WE reached this Hacienda at noon yesterday, and such is the hospitality of these people that they expected us to spend at least two weeks with them, and had arranged various excursions to points of interest in the neighbourhood. We compromised by agreeing to wait until to-morrow morning. This house is of much more recent construction than the one at the Hacienda Cusin. The owner, Señor Don Ignacio Fernández Salvador, spends much of his time in Paris, and is indeed there at this moment, and it is therefore quite natural to find his own rooms in the house finished and furnished in the modern French style, very comfortable and with a large library of the best French works—scientific and literary, and a profusion of modern French novels.

The front of the drawing-room is almost wholly of glass and gives a comprehensive view of a very peaceful, restful landscape. In the foreground, and occupying a depression in the rolling plain, is a lake half a mile long with flocks of wild duck and with surrounding paths and flowering shrubs, and small conifers which promise to add to the effect of this landscape gardening. The artificial embankment at the end of the lake is hidden by a turn in the stream valley and

there is no jarring feature in the view from the drawing-room window. In the distance, miles across the grass-covered plain to the east, is the rather regular, seemingly low, vegetation-covered mountain rim, which we know, immediately beyond, plunges with rain-dripping, jungle-forest slopes, thousands of feet to the low-lying Amazon drainage.

The Hacienda Cusin was in a rather narrow valley at the very southern end of the Ibarra mountain-park with rugged rocky volcanic peaks nearby, the Hacienda El Vínculo, on the other hand, is near the opposite or northern end of the mountain-park in the midst of a broad, gently undulating plain, whose surrounding mountains, rising only 2,000 feet above it, are rounded and without rocky cliffs and jagged outlines. To the north and west are the Paramos of Angel and of the Altos de Boliche, on the other side of which is the Tulcán-Túquerres mountain-park, partly in Ecuador, but to a greater extent in Colombia.

The high plain on which we are now has a mean elevation of about 9,300 feet and is, on the whole, a trifle higher than the first or high-level of the Quito mountain-park, of which it is the representative in this basin. Although the remnants of the high-level in the Quito park fringe the edge of that basin, its total area is much less than the second-level, while the high-level of the Ibarra park is of importance only in the northern end of the basin, where it is broad and extensive, covering about 250 square miles, and is quite as important as the second-level which is rather interrupted and contracted not only by the stream valleys which trench its surface, but by the inter-basin peaks and ranges.

This second plain, with a mean elevation of 7,500 feet,



Sheep on the Equator



Ecuadorian cattle land—the great grass-covered upper level of the Ibarra mountain-park in the vicinity of San Gabriel

is rather lower than its counterpart in the Quito basin, and we observed no representative of the third or lowest terrace, though there seems reason to suspect its presence in the region of Salinas, with a rather lower elevation than the third-level of the Quito park. Between the upper and middle level, in a deep canyon, flows the Rio Chota across the middle of the basin in an east-and-west direction and joins the Ambi, which represents the drainage coming northward from Otavalo to the Mira. This stream passes in a north-west direction towards the Pacific in a trench cut in a broad structural valley in the mountains, and the second plain extends for some distance in this direction along the sides of the Mira valley.

There is some difficulty in connecting the so-called Western Cordillera chain across the Mira valley with the mountain-knot which lies to the north and east, and the conception of the Andes of Ecuador as a double chain requires modification in the sense of considering it rather as a single chain in whose complex top these mountain-parks are situated.

We left our pleasant stopping place, in the southern end of this mountain-park, about 9 o'clock on the morning of the 4th of July, having started the men with the cargo animals about an hour before with instructions to wait for us at Ibarra, where we planned to spend the afternoon and night. We passed through the village of San Pablo, where with commendable civic pride the citizens had just begun the paving of the streets, and along the shores of the lake with its mirrored reflection of the adjoining peaks. Then over a spur of the Cerro Cunru by a narrow trail through small Indian fields and finally through larger ones of wheat,

barley and alfalfa, into the broad graded highway which leads from Otavalo to Ibarra and along which one could easily drive in an automobile from the one city to the other, were it not for two broken bridges.

Passing along, we found ourselves in the plain of the second-level stretching away to the northward, and lying between the Western rim and the mid-basin series of peaks of which Imbabura marks the northern terminus. The crest of the Eastern rim lies 25 miles away, and we are separated from it not only by the Cusin-Cunru-Imbabura chain of peaks, but by a spur running north from Cayambe. We are therefore in the western third of the Ibarra basin.

To the left and beyond the depression of the Rio Blanco are the church towers and buildings of the pretty village of Cotacachi, while beyond and to the northwest, rising as a symmetrical snow-covered cone, slightly above the mass which forms the western range, is the old volcano of the same name (16,300 feet). In the distance to the north there is another peak rising above the general level of the western mountains, Yana-urcu or the Black Mountain, so called because its top is composed of black volcanic rock which forms a notable contrast with the snow cap that from time to time during the year mantles its summit.

But the dominating feature of the landscape is the old volcano of Imbabura on the right of the road, that follows around its foot, first on the west and then on the north, into the town of Ibarra, which lies seven miles northeast of the summit. Imbabura, though over 1,000 feet lower than Cotacachi in absolute elevation, is the more imposing mountain, as Cotacachi rises but a little above a great mountain range and cannot impress the eye as Imbabura, which tow-

ers over 7,000 feet above the plain that encircles it. The snow-cap on its summit, which we saw a few days ago, is much smaller to-day and will soon disappear. It is due to the same period of wet weather which gave us reason to remember the crossing of the Paramo of Mojanda. There is, however, still enough snow remaining to accentuate the very black plug-like mass of volcanic rock which forms the crest of the peak. Cultivated fields are found not only on the plain but extend far up the sides of Imbabura, and we passed many scattered fields of wheat and barley. The soil is a rich volcanic one and seems capable of producing many times its present output.

It is related of Imbabura that it has in historic times discharged great quantities of mud filled with innumerable dead fish of the species peculiar to the high Andean region and locally called "Preñadilles." The historian Velasco who, in 1765 or 1766, was stationed at the Jesuit College at Ibarra, relates that the volcano had had several eruptions of water so full of this fish that the plain of Ibarra was polluted with their dead bodies, and that on one occasion he narrowly escaped drowning when he was high on the side of the mountain during one of these eruptions. Humbolt, solely on a statement made by a native over a hundred years after the event is supposed to have taken place, relates that in 1691 there was a large escape of mud from Imbabura which contained so many preñadilles that their rotting bodies polluted the whole region and occasioned malignant fevers among the inhabitants of the neighbourhood. These marvellous tales were investigated and disproved by Dr. Theodoro Wolf, who was for some years professor in the Polytechnic School in Quito, and Government Geologist

of Ecuador, and to whom Ecuador is indebted not only for the best map of the Republic which has yet been prepared, but for a masterful treatise on the geography and geology of the country, all done with characteristic German care and thoroughness. Dr. Wolf visited the crater of the volcano in 1871 and found that it had clearly been extinct for many centuries. He points out not only that it is certain that there has been no eruption of Imbabura in historic times, but that the preñadilles do not live at an elevation greater than 10,000 feet, and that the crater of the volcano is several thousand feet higher. He observed that landslides were a common occurrence on the slopes of the mountain, particularly during earthquakes, and the basis of these tales appears to be that bodies of water temporarily impounded by landslips have quickly accumulated in sufficient quantities to sweep away the soft barriers, and the mass of water filled with volcanic debris rushed down the mountain side, gathering momentum and material as it went and entrapping a few fish when the mountain flood reached the lower levels where these fish live. They are not found in large quantities even in these mountain streams, and so would be virtually lost in the mass of mud. That their destruction could ever have polluted the air and caused disease in the country should be dismissed as a product of the imagination. During the great earthquake of 1868, which entirely destroyed all the houses in Ibarra, Cotacachi and Otavalo, many such landslips occurred on the sides of the old volcanoes of Imbabura and Cotacachi, and one of these on Cotacachi gave rise to the same sort of incorrect tale of volcanic activity.

As we followed the high road around the foot of Imba-

bura we passed under a series of arches extending across the road at a little village. These arches were covered with the light green moss and lichens from the paramos and decorated with flowers, and led in each direction up to a central construction consisting of four pillars surmounted by a dome, all representing a part of the Indian celebration of the fiesta of the 1st of July which we saw in progress at the Hacienda Providencia on the first day's journey from Quito. In time we reached the village of San Antonio, 7,800 feet above sea level and five miles, a little south of west, from Ibarra. Here we were met by Señor José Ignacio Peñaherrera, a cousin of our Quito friend, Dr. Victor Manuel Peñaherrera, who informed us that he had a house to place at our disposal and a luncheon waiting for us at Ibarra.

The new road from San Antonio to Ibarra leaves the village of Caránqui some distance to the right, and the town was pointed out to us as founded on the site of an Indian village of great importance and antiquity, at which, it is alleged by some, Atahualpa, the last of the Incas to exercise any power, was born. It was his father, the XIth Inca Huayna Capac, who is stated by some historians to have completed the conquest of the Indian kingdom of Ecuador, which was originally a confederacy of Indian tribes, each maintaining its own language, and approaching in importance and civilisation the Inca's own kingdom of Peru, which was an amalgamation of tribes that had been forced to adopt the language and customs of their rulers. The chiefs of the Ecuadorian confederacy bore the title of Shiri and had Quito as their capital, while Inca was the title of the rulers of those who either naturally or perforce spoke the Quichua language, and had their capital at Cuzco.

Over a hundred years before the arrival of the Spaniards the Inca undertook the conquest of the Shiri's kingdom, and there followed many years of bloody warfare. According to one story, the last or XVth Shiri was defeated in 1476 in a series of battles on the very plain across which we have just passed, and died of wounds received in the final struggle on the hill of Atuntaqui, which we saw to the left of the road about two miles west of San Antonio. After this battle the XIth Inca took as one of his wives Paccha, the daughter of the XVth Shiri, and, according to some, Atahualpa was the son of this union, born at Caránqui. Prescott represents Atahualpa as the favourite son of his father and states that the father on his death in 1525 divided his kingdom into two parts, giving the southern portion with Cuzco as its capital to his legal heir, Huascar, and the northern part with Quito as its capital to Atahualpa.

Whether or not the XIth Inca ever attempted to divide his kingdom in this manner, Huascar and Atahualpa were at war soon after his death. Huascar's forces were finally defeated and Atahualpa acknowledged the one ruler in the year 1532, the very year in which the Spaniards reached the coast of Peru. The Spaniards therefore found the Indians exhausted by a hundred years' constant and bitter warfare and disrupted by the struggle between the two Inca brothers. Had the Spanish invasion occurred a hundred years earlier when both the Inca and Shiri kingdoms were in the height of their power, or a few decades later when Atahualpa had had time to consolidate his position, the history of the Spanish conquest of these regions would, in the opinion of some, which I do not entirely share, have been a very different tale.



The Plaza and Municipal Building



The Hospital and Market Place

IBARRA AND THE OLD VOLCANO OF IMBABURA

The Indians were really appalled by the horses of the Spaniards, and many accounts are given of their fleeing at the sight of them. Cieza de Leon relates how the crafty chief of Otavalo used this fear for the undoing of the chief of Caránqui. He says: "The natives of Caránqui are very hostile to those of Otavalo for the following reason: When the news of the arrival of the Spaniards was spread abroad in the provinces of Quito, together with the imprisonment of Atahualpa, the people were filled with wonder and fear, and were particularly astonished at what they heard concerning the swiftness of the horses. Thus they awaited their arrival, thinking, that as they had overthrown the Inca their Lord, they also would be subjugated. At this time the Lord of Caránqui had a great quantity of treasure in his charge, and he of Otavalo observed that his neighbour was in great fear and perturbation for the safety of the precious treasure. The chief of Otavalo then called together his people and, selecting those who were most agile and cunning, ordered them to dress in shirts and long mantles, and, with wands in their hands, to mount their best sheep (llamas) and to climb up into the heights, so that they could be seen by those of Caránqui. He, with most of his people and some women, in the meantime fled to Caránqui with great demonstrations of fear, saying that he was flying from the fury of the Spaniards, who had reached his villages on their horses, and that he had left all his valuables behind, to escape from their cruelty. This news caused great terror, and it was received as certain, because the Indians, mounted on sheep (llamas), could be seen on the hills, so the people of Caránqui began their flight. Otavalo pretended to do the same, but he and his people returned to

Caránqui, and stole all the treasure they could find, which was not little. When those of Caránqui returned, at the end of a few days, the deceit was discovered. This strange robbery caused much agitation among the people of Caránqui, and they had several debates among themselves; but, as the captain Sebastian de Belalcazar, with the Spaniards, entered the provinces of Quito a few days after this occurrence, they dropped their quarrels in order to defend themselves. Thus the people of Otavalo retained what they had robbed, as is stated by many Indians of these parts, and the feud has not ceased amongst them."

The reputed birth of Atahualpa at Caránqui is not in accordance with the record of Sarmiento de Gamboa, which represents the sworn statements of the descendants of the Incas living at Cuzco in 1572. Cieza de Leon, who visited Caránqui ten or fifteen years after the Spaniards first arrived at this locality, does not credit the story; but he reports that the town had been a very important Inca fortress, with a large garrison, and the seat of the administration of the country to the north which the Incas had conquered. According to his account there was here a great palace of the Incas, made of stones neatly fitted together without cement. Within there was a basin of cut stone, and nearby a great Temple of the Sun, of which enough was left to show that it was once a very important structure. According to the accounts he received, this temple had been held in very high esteem, was attended by 200 maidens, analogous to the Vestal Virgins of the early Roman civilisation, and had its inner walls covered with plates of gold.

As we rode towards Ibarra with Señor Peñaherrera, other gentlemen who had ridden out to meet us joined the caval-

cade, and about a mile from the town we were met by an automobile containing the Governor of the Province of Imbabura and members of his staff, who officially welcomed us to the capital city of the Province. Ibarra was founded in 1606, seventy-two years after the Spaniards first entered Quito, under the direction of Señor Don Miguel de Ibarra, the XIth President of the Real Audencia de Quito, after whom it was named. Unlike many of the cities founded by the Conquistadores, it does not appear to have been built on the site of an important village, such as the nearby Caránqui and Atuntaqui undoubtedly were, but the flat plain with the excellent drainage afforded by the small stream, the Rio Taguando, makes of it an excellent site.

The city was entirely destroyed by the earthquake of 1866, which is reported to have caused the death of 20,000 people in the Ibarra mountain-park, and is regarded by Wolf as the most disastrous which has been experienced in Ecuador. The city of to-day which has risen out of the ruins of yesterday is characterised by broad, straight, well-paved streets and rather pretentious buildings. Before the earthquake it is said to have contained 15,000 people, but the present population is nearer 10,000, among whom there are a few negroes from the neighbouring warmer valley of the Chota.

The quarters placed at our disposal faced the Plaza, which is prettily planted with palm trees and has a fountain in the centre. Near us was the Cathedral and Palace of the Bishop, across the Plaza the well-built Government Building, and on the other side the Municipal Building, quite an important structure and affording a particularly pleasing sight from our window with the palms of the Plaza in the

foreground and the cloud-encircled Imbabura towering up behind, looking as though it were on the very edge of the city instead of seven miles away.

Lord Murray received a card of welcome from the Bishop of Ibarra on his arrival and subsequently called on His Eminence. The Bishop was most cordial and said that he hoped the Firm would construct the Pailon railway. This project involves a line from Quito across that basin to Cayambe, and thence to Ibarra and down the valley of the Mira to El Pailon Bay, which is a well-sheltered harbour with deep water on the Pacific coast just south of the Colombian boundary. The Bishop felt that the construction of the railway was essential to the progress and welfare of the country and especially of these northern mountain Provinces with their great and relatively undeveloped agricultural possibilities. He gave us a letter of introduction to all the priests of his diocese, which extends from Ibarra to the frontier, and expressed the hope that we would return to Ecuador at an early date and assist in the development of the country.

On the following morning we crossed the modern bridge over the Taguando, were soon on the shores of a little lake, the beautiful circular Yaguar-cocha whose surface is 7,300 feet above sea-level and less than 100 feet above Ibarra, whose inhabitants find it a favourite pleasure resort. This lake is about three-quarters of a mile in diameter and occupies the crater of an old volcano which in its last violent eruption, centuries ago, blew out almost the whole of its western side. To the eastward the cliffs above it are very steep and culminate in the peak of Ventanillas, 10,000 feet high. The western rim is not high, but the remnants of the

rock masses which once formed this side of the volcano are seen sticking through the plain level beyond the Rio Taguando, where they were thrown by the last explosion. The Indian words Yaguar-cocha signify "the lake of blood" and commemorate the battle fought here about the beginning of the sixteenth century between the Inca and the rebellious Caránquis. Following the defeat and death of the XVth Shiri, the Caránquis who formed a part of the Shiri's kingdom rendered allegiance to the Inca, but subsequently during the absence of the Inca in his capital city of Cuzco, they rose in a rebellion which was so drastically suppressed on his return, it is said by the early Spanish chroniclers, that the blood of 20,000 Caránquis dyed the waters of this lake and gave it the name, Yaguar-cocha.

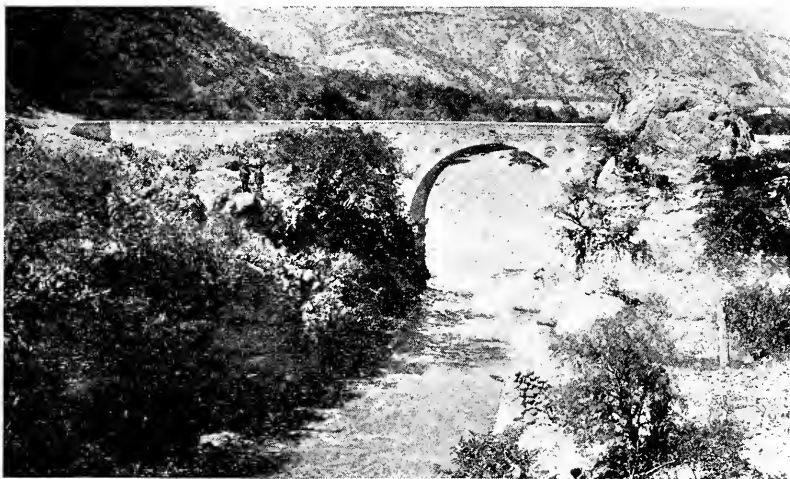
The trail climbs along the northern rim of the lake to the group of buildings known as Aluburo, and from here, 1,000 feet above the lake, there is a magnificent panorama of the fertile, well-watered lands of the Imbabura-Otavalo region. Immediately beyond we cross the crest of the range which extends into the Ibarra basin from Cayambe, and begin the long descent of 3,000 feet into the valley of the Rio Chota. The country as we approach the river becomes more and more arid, drifting sands appear and the whole landscape, with its stunted thorn-bushes and many species of the cacti family, is of desert character. The conditions here and through the Ibarra park confirm the hypothesis suggested by observations in the Quito basin, that in these high Andean valleys the amount of rainfall decreases with the depth of the valley below the level of the encircling mountain rim. The valley of the Chota is about a mile wide, and all along its course are flat lands capable of irrigation, for which the

stream would furnish an abundant supply of water and which will some day be covered with fields of sugarcane and cotton and groves of oranges and other tropical fruits. It is very warm and we ride slowly through the two rows of hovels which constitute the settlement of Chota (5,080 feet above sea-level) to the bridge across the river. We had arranged that the mule with the luncheon basket should await us, and we had luncheon on the rocks under the bushes by the bridge.

This has been a favourite crossing place for many years and rumour has it that the Spaniards found an Indian bridge at this place. However that may be, we observed the ruined abutments of two old bridges below the present structure. The river, which above has a rather wide channel between soft banks, here passes through a narrow, steep-sided cut in the rock with the bordering hills closing in on both sides. An excellent stone arch bridge of modern construction now spans this gap, and the water in its narrow rock-bound channel is 25 to 30 feet below. Small rocky knolls rise 10 to 15 feet above the level of the bridge on the sides of this cut and the road passes between two of them on the south bank. This contraction in the valley affords a very good dam-site where it would be easy to construct a dam rising 60 feet above the present water level. . The hill on the south is of solid rock and the spillway would necessarily be here, as the hill on the north is of soft material. Such a dam would afford water for the irrigation of the fertile benchlands along the stream valley below, and would yield power for the woollen mills which in time will be built and operated in the higher portion of the uplands of Ecuador. The wool-growing capacity of parts of this mountain region ap-



Village of Chota, Ecuador



The Bridge of the Chota

THE DRY VALLEY OF THE CHOTA

pear enormous, but there is to-day no transportation which would enable it to compete in the markets of the world.

The Chota valley "enjoys" at the present time the reputation of a veritable plague-spot second only, in the Northern Andes of Ecuador, to the depths of the Guailabamba. Friends in Quito said it would be nothing short of suicidal to spend a night in the valley of the Chota, and at Ibarra we were again warned that we must on no account fail to reach the uplands on the north side of the river by nightfall. The Chota here has an elevation of 5,000 feet above sea-level, which is 2,000 feet higher than the famous Cauca valley in Colombia, and we may perhaps be pardoned for thinking that the reputation of the Chota is hardly due to any inherent evil quality and that it will become, with only reasonable care, a pleasant home for man. From the bridge of the Chota there are two roads to San Gabriel; the one most commonly followed passes up the valley of the Rio del Angel, which enters the Chota just below the bridge, through Mira to Angel (which with an elevation of 9,800 feet is situated on the edge of the high-level plain), and thence across the plain to San Gabriel. We were, however, informed that this road was now in bad condition, and as we did not feel that our education would be particularly increased by a further acquaintance with the mud-holes of an Andean trail, except by the possible addition to our vocabulary of certain Spanish words of not altogether a conversational type, we turned sharply to the right at the bridge and entered a little-used trail which constitutes the alternative route.

This follows the north bank of the river almost due east for three or four miles where, just beyond a half-deserted

collection of miserable negro huts with small irrigated patches of sugarcane, it starts to climb the north wall of the valley. The trail here is really a very well-constructed one, but the climb is almost 4,000 feet, and although it zigzags back and forth, it is perforce steep and in many cases but a narrow ledge hewn out of the rock. We met several cargo-trains coming down, and the passing of these in some of the more narrow places was decidedly awkward.

As we climbed this valley wall we saw, across the Chota and on a low bench above it, the picturesque town of Ambaqui, which we were informed was surrounded by coffee plantations and sugarcane and cotton fields. Further to the south, along the valley of a tributary of the Chota, is Pimampiro on a bench at about the same level as Ibarra, and nearby is the lake of Angas-cocha ("Blue Lake"), apparently another crater lake like Yaguar-cocha, which is almost due west of it on the opposite side of the subordinate basin-range which we crossed between Ibarra and the Chota. Ambaqui and the region south of the Chota are in the Province of Imbabura, but we are now in the Province of Carchi, which is the northernmost division of Ecuador in the Andes, as is signified by the name itself, derived from the Indian words meaning "the end" or "border."

We finally complete our climb up the hills on the north side of the Chota valley and find ourselves at the edge of the first or high-level plain, a beautiful, green, cool, well-watered region in marked contrast to the arid valley through which we have just passed. The plain here rises to a low east-and-west ridge which is appropriately called "the edge of the valley of the Chota," and has an elevation of 10,000 feet. From this point the plain, which has a mean elevation of

about 9,300 feet, slopes away to the northward and eastward and then up again to the edge of the bordering mountain rim. Our road follows along the eastern edge of this low ridge above a deep stream valley draining the plain. It is now almost dark and we see ahead a group of buildings which we imagine is the place selected for the night's halt. In the gloaming it looks only a short distance, but instead of the road going straight, it passes from the hill-points sharply up little hidden valleys and out again, causing just the sort of delays in reaching one's destination which are irritating at the end of a long day's ride.

Just after nightfall we reached the buildings, which abut upon the road, and passing through a great gateway with massive wooden doors, entered a large torch-lit square enclosure, which is really a great red-tile-roofed building in the shape of a hollow square with the centre open to the sky. On two sides rooms have been finished under the roof, but on the other two the roof forms a shelter for the animals. We found the last of the packs just being removed, and when the saddles were taken from our own mounts and they had been fed with barley and maize from the supply kept for sale to travellers, the whole band of horses and mules were driven out to pasture for the night. We opened out our bedrolls and set up our folding canvas beds, much to the surprise and interest of the few Indians standing round, and for the first time on the trip broke into our provision boxes and prepared our evening meal.

This place is known as Chulunguasi and is a well-recognised stopping place, or "Tambo," for cargo-trains and travellers. Five miles beyond is the town of Bolívar, which is 8,700 feet above sea-level. Formerly this place was called

Pistú or San Blas de Puntal, but more commonly simply Puntal. The name has but recently been changed to Bolívar, with the same patriotic regard for the common hero of Ecuador, Colombia and Venezuela which gave the name of Washington to innumerable villages, towns and cities in the United States. It is said that the inscription on the ancient Church which was destroyed by the earthquake of 1868 indicated that the town is on the site of an Indian village whose chief was known to the Spaniards by the name of Martín Puntal, whence the old name of this settlement.

As we rode into the outskirts of Bolívar on the morning of the 6th of July we saw coming down the street a gentleman on horseback followed by two Indian horsemen driving a dozen horses. When he approached we learned that he was Señor Carlos Nicholls who, though the son of an Englishman, speaks only Spanish. He is the manager of the Hacienda El Vínculo and had ridden the eleven miles from that place in order to welcome Lord Murray and his companions and bring horses so that we might have fresh mounts in case our own beasts had been tired by the journey. He turned and rode with us through the town and across the undulating plain. For the most part it is a great pasture land covered with a thick white-clover sod, but here and there with fields of barley and wheat and occasionally maize. In some places areas, considerable in themselves, but small compared with the total extent of the plain, are quite denuded of their soil by faulty methods of cultivation and the bare rock is exposed.

We turned aside from the main highway a few miles to the southwest of San Gabriel (formerly Tusa) and entering the Hacienda El Vínculo, rode for over an hour through its

fields before reaching the headquarters and principal dwelling house. This property contains about 60,000 acres or approximately 100 square miles, almost wholly pasture land, and is one of the most important estates in the temperate region of Ecuador. We saw excellent cattle, but while their number was in the aggregate large, they represented but a small fraction of the number this rich pasture land is capable of supporting. When we commented on this, the reply was: "Why raise more? There is no market and they will but disappear in the next revolution. As it is, we drive 5,000 head a year to Quito, but the journey is, as you know, over very rough mountain trails, a distance of 100 miles, and the cattle so lose in weight that the net return per head is very small. Of those which reach Quito 1,000 are shipped by rail to Guayaquil to supply the local demand there. This is the extent of the market under existing conditions of transportation. We could increase our output many times, but what would we do with it?" Señor Nicholls felt that the future of this region, however, lies more in sheep than cattle raising, and stated that should the Pailon railway be constructed, everyone in that region would at once go into sheep-breeding on a large scale.

Arriving at the dwelling house, we found a delightful luncheon awaiting us, and this was scarcely finished when the officials from San Gabriel and other local notabilities called to pay their respects. They at once impressed on Lord Murray the urgent need of the Pailon railway, without which they thought this portion of Ecuador could not develop, and expressed the hope that we would not only undertake its construction, but would purchase the El Vínculo estate, which they thought could be acquired on reason-

able terms, and so become personally interested in the future of the region. They stated that this estate, like the rest of the country, was virtually undeveloped, only a portion of its lower ground being utilised on what was a very small scale compared with its possibilities.

The horses of El Vínculo are of sturdy Chilian stock, having a great reputation as mountain climbers, and we desired to purchase some of them, but Señor Nicholls said he would not sell them to us, but we could take as many as we liked and use them for saddle purposes to Bogotá itself, if we desired, and we finally arranged to use four as far as Pasto.

The cargo train with our saddle mules left here this afternoon in order that they may pass over the Altos de Boliche to-morrow morning and arrive at Tulcán at noon, where, thanks to the fresh horses supplied by Señor Carlos Nicholls, we expect to catch up with them. The papers and letters we have prepared here yesterday and to-day will leave by an Indian runner for Quito at 3 o'clock to-morrow morning.

THREE

SAN GABRIEL TO PASTO

Pasto,
Departamento de Nariño,
Colombia.

13th July, 1913.

WE learned from a telegram en route that the Indian runner who left the Hacienda El Vínculo with our papers at three o'clock on the morning of the 8th of July reached Quito and delivered them as directed the afternoon of the following day. We were informed by Señor Nicholls that he would do this, but as the distance is an even hundred miles and there are the gorges of the Chota and the Guailabamba, as well as the Paramo of Mojanda, to pass on the way, it seemed hardly credible. The speed of these native messengers is very remarkable, and it was by half-league relays of such runners that the Incas maintained a regular postal service between Cuzco and Quito, as well as between these cities and the other important military stations of their kingdom. The usual charge to-day for a messenger of this kind between El Vínculo and Quito varies from five to ten sucres, that is \$2.50 to \$5.00, and as the messenger will return by easier stages, it represents the wage for very special exertions covering a period of from five days to a week during which the messenger defrays all of his own expenses.

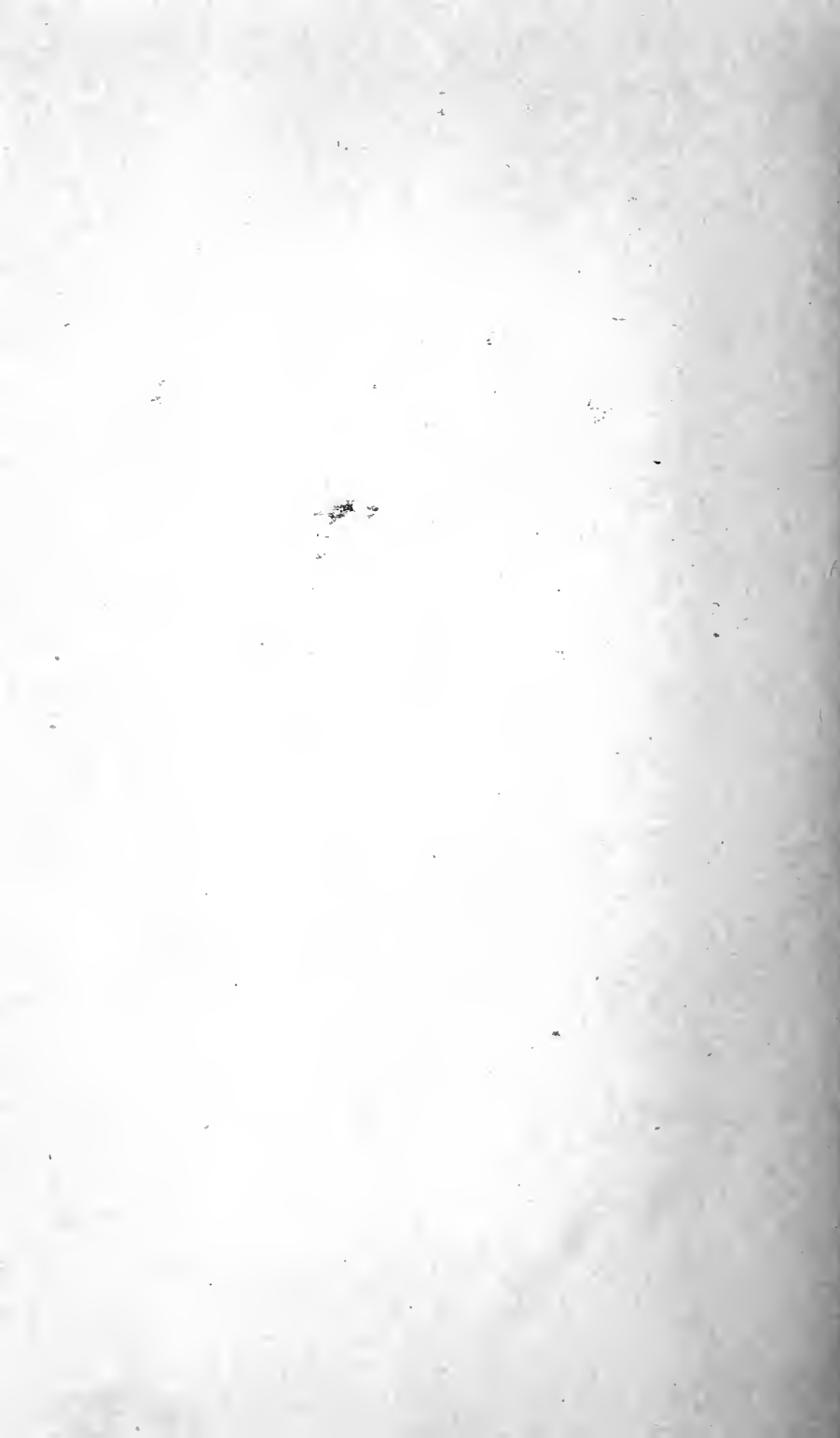
Our departure from El Vínculo was made some hours after the messenger started for Quito. We entered the main road again near San Gabriel, the centre of a popula-

tion of about 8,000 and the most important town in the high-level of the Ibarra basin. This town is 9,400 feet above sea-level and at the foot of the slopes which lead up to the Paramos of Angel and Altos de Boliche. These slopes are not very steep, and being well-rounded, are covered with many fields. The best pass across the paramo, however, occurs a little farther east, and the road therefore follows along the base of the hills for ten miles to the village of Huaca, at the extreme northeastern corner of this high-level plain at an elevation of 9,700 feet. It has so far escaped the epidemic for changing the old Indian names to modern ones, which has affected most of this region north of the Chota.

Leaving Huaca, we began the ascent of the Altos de Boliche on a very well-constructed, carefully laid-out highway, along which one could easily drive in an automobile. On the Huaca side of the ridge, one gets views of the plain we have just crossed and the surrounding mountains, but the road is, for the most part, in depressions between the low spurs of the range, and the ascent is so gradual that we were surprised upon turning a small knoll, nine miles from Huaca, to find ourselves on the divide at an elevation of 11,400 feet with the great agricultural basin-upland of Tulcán-Túquerres spread out at our feet, fifteen hundred feet below. It is a wonderful sight, a great rolling sea of green with villages dotting its surface here, there and everywhere, no marked forest, just grazing-land broken occasionally by now yellowing fields of grain. At the foot of the gentle slope of the Altos de Boliche, and six miles distant, is Tulcán, then a low-rounded mid-basin ridge and beyond, twenty-five miles away, the bordering mountain-



THE TULIÁN-TÚQUERRES MOUNTAIN-PARK
View from the Altos de Boliche of the great agricultural upland,
part in Ecuador and part in Colombia



rim, with the dark cones of the old volcanoes, Mallama and Ázufra (13,400 feet), set in a gap in the range, near which, and on the northern border of the basin, is Túquerres.

The Tulcán-Túquerres mountain-park is the last and northernmost of the series of elevated mountain basins through which we have been passing. North of it the mountains break into three very distinct chains, in one of which, about Bogotá and to the northward, there are several elevated mountain-basins. However, in the region of Bogotá, popular geography, and it seems to me quite rightly, considers these as but features of the complex top of a single range, and it is really one of the vagaries of nomenclature that the mountains about Bogotá should be considered a single range, while the chain through Ecuador with the same high-level parks and with possibly a less aggregate width, should be considered a double one.

A rather more correct idea of the broad relation of the Andes of Ecuador to those of Colombia, may be obtained by thinking of the Andes of Ecuador as a single chain, rising steeply from the Pacific and sinking with equal abruptness to the Amazon drainage, and in whose very top there are these high parks. This single range breaks into three very distinct parts in southern Colombia: the Cordillera del Chocó, the Cordillera del Quindío and the Cordillera de Sumapaz, or the Western, the Central and the Eastern Andes, respectively.

The Cordillera del Chocó is the coast range in the southern half of Colombia and, extending northward, its last low spurs die out against the shore of the Caribbean Sea, between the mouths of the Atrato and the Magdalena. North of Buenaventura there is a low coast range, the Ser-

ranía de Baudó, which is the southern end of the chain extending from North America and through which the Panama Canal has been cut at the Isthmus. In Colombia it is separated from the Western Andes by the broad alluvial valley of the Chocó, which is occupied by the Atrato and San Juan rivers, the one flowing north into the Atlantic and the other south into the Pacific. This valley forms the topographic break between North and South America, and on physiographic grounds the North American Continent extends along the Pacific coast almost as far as Buenaventura, with the line between the two running through this Chocó valley. It is related, but as often denied, that the Spanish priests soon after the conquest cut a small canal through the flat lands of this valley between the present head-waters of the Atrato and San Juan and passed in their canoes through the first inter-oceanic canal on the American Continent. This is, however, of more academic than practical interest, for the building of a ship-canal by this route was long ago condemned, and for very adequate reasons, in favour of the line along which the great canal has been built.

The Cordillera del Quindío, or Central Andes, lies between the Patía-Cauca valley and the Magdalena valley. It is rather the highest of the three, but does not extend as far north as either of the other two, and its last low northern spurs disappear above the junction of the Magdalena and Cauca rivers, 170 miles from the sea.

The Cordillera de Sumapaz or Eastern Andes lies between the valley of the Magdalena and the great low-level plains which are drained by the tributaries of the Amazon and the Orinoco. First a simple ridge, it widens into a

complex range in the region of Bogotá, and for a distance of 250 miles contains high-level parks similar to those through which we have just passed and then, in an entirely analogous manner, breaks into two ranges, one extending eastward along the coast of Venezuela into Trinidad, and the other northward along the line between Colombia and Venezuela, and disappearing as a marked range before reaching the coast. The northward prong of the Eastern Andes is separated by the alluvial valley of Upar from the enormous snow-covered pyramidal mountain-mass of the Sierra Nevada de Santa Marta, which, situated just east of the mouths of the Magdalena river and with the waves of the ocean beating against its northern cliffs, is one of the magnificent sights of a journey by ocean steamer along the northern shore of South America. This mountain is by some considered to be an extension of the Central Andes, and while there may be some geologic basis for this view, it is topographically and geographically a mountain standing alone, like the mountains of our childhood dreams.

The Tulcán-Túquerres mountain-park is separated from that of Ibarra by the Altos de Boliche, sometimes called the mountain-knot of Huaca. From this knot a mountain-rim extends to the northeast, forming the eastern boundary of the basin, in the same way as the range extending to the south, and which we have referred to in previous descriptions by the local name of the Eastern Cordillera of the Andes, forms the eastern boundary of the Ibarra park. On the west and north the Tulcán-Túquerres basin is limited by ridges which, starting from the western end of the Huaca mountain-knot, contain the string of volcanoes

of Chiles (15,675), Cúmbal (15,700), Azufral (13,400) and Galera, or the Volcano of Pasto (14,000).

The water outlet of the Tulcán-Túquerres park is through the north side of the basin by means of the gorge of the Rio Guáitara, between the volcano of Galera and the Paramos of San Roque and Frailejón. It differs in this respect from the parks to the south whose drainage is to the east or west and whose waters flow down the slopes of the Andes directly into the Pacific on the one hand, or the Amazon drainage on the other, but the waters from this northernmost park of the series flow into the trough which separates the Cordillera del Chocó or Western Andes, from the Cordillera del Quindío or Central Andes, from which it eventually finds its way into the Pacific.

The basin consists essentially of the same first or high-level which we observed in the Quito and Ibarra parks, but which here has a mean elevation of 9,800 feet. This level has been very greatly trenched by stream channels, as in the other basins, but the erosion has progressed rather farther, with the result that the topography is for the most part well-rounded and the relief, while great, is of a less precipitate character than immediately along the Guailabamba and Chota, and the hillside, from the very bottoms of the valleys to the paramo line above, are covered with fields. It is a magnificent country.

From the summit of the Altos de Boliche to Tulcán is six miles, and the descent fifteen hundred feet, but the road has been very well laid out and the gradient is therefore a relatively gentle one. We had proceeded only a short distance when we were met by a great cavalcade, including the Governor of the Province of Carchi, the Commandant

of the troops stationed at Tulcán, accompanied by several officers and many local notables. We subsequently visited the barracks, and while the appearance of the troops at Otavalo was one of great smartness, the precision of the drill here was perfect. These are soldiers of which any nation might well be proud. The present high standing of the organisation of the Ecuadorian army is the work of Colonel Cabrera, a Chilian officer, loaned by that country to Ecuador for the purpose of training its army, and who seems to have inspired the Ecuadorian officers with his own efficiency. Col. Cabrera played a very important part in the last civil war, and was not a small factor in the success that General Plaza achieved, resulting in his election as President of the Republic.

The Chilian influence in the western part of South America is very far reaching, very subtle and very effective. We understand that five more Chilian officers are to be added to the Ecuadorian army, and at Bogotá we found other Chilian officers in charge of the training of the Colombian Army. Chili's diplomatic representatives and army officers are men of ability and power. Their influence is very much for good, and the amalgamation of the Andean States of South America into one Republic appears much more reasonable and possible than the union of these Republics or any part of them with any other nation. Certainly neither the United States of North America nor Great Britain have any desire whatever for territorial acquisitions in South America, nor is it possible for Germany to expand in this direction, even though her diplomats never cease their activities. The great and progressive Republic

of Chili has a very strong as well as singular national motto: "Por la razon ó por la fuerza" (By reason or by force!).

Tulcán is essentially a town of one street about a mile and a half long. The Plaza and Government buildings are near the northern end, and the town is here broader, containing a number of cross and side streets. It is said to contain a population of 10,000 to 15,000, but these figures perhaps relate to the population of the parish, which covers a considerable surrounding area, rather than to the town itself, which apparently has a population not half so great. Its elevation, according to the Intercontinental Railway Commission, is exactly 10,000 feet above sea-level. The most striking topographic features visible from the neighbourhood of the town are the twin snow-covered volcanoes of Chiles and Cúmbal, whose summits lie twelve to fifteen miles to the northwest. Almost exactly the same height, both perfect cones, each rising 3,000 feet above the level of the surrounding mountain mass and 6,000 feet above the Tulcán-Túquerres plain, and with occasional streamers of vapour from their glistening white summits, they are indeed noble mountains. According to Wolf, no eruption of these volcanoes is known in historic times, but there are occasional discharges of steam and sulphur vapours which deposit free sulphur in the deep crater of Cúmbal.

Two and a half miles north of Tulcán is the boundary between Ecuador and Colombia, here following the course of a little stream called the Rio Carchi. It is a singularly unnatural frontier line, throwing as it does a small fragment of this great mountain-park into Ecuador, and the larger part into Colombia. Why the boundary between the two modern Republics should have been fixed here

rather than along the summit of the Altos de Boliche, we do not know, but the Indian name of the little stream, which, as has been pointed out, means the "limit" or "border," suggests that the present international line is but the survival of the boundary between Indian tribes. There is indeed evidence for considering it the northern boundary of the Inca Kingdom. However this may be, the twelve miles along the course between the stream junction, just below the little settlement of Chiles, and the natural bridge of Rumichaca, is the only part of the hundreds of miles of boundary between these two Republics which is not the subject of dispute. Toward the Pacific, Ecuador claims that the boundary passes to the north of Chiles and down the Rio San Juan and the Mira to the sea, while Colombia holds that it runs to the south of Chiles and that all of the San Juan and the Mira below the juncture of the former stream belongs to it, together with a strip of territory on the south of the San Juan-Mira line.

To the east the claims of the two countries are even more divergent. Ecuador would have the boundary run from the bridge of Rumichaca directly to the eastern mountain-rim and follow it north to the latitude of Pasto, where it would turn eastward, but Colombia holds that it runs almost due south from this bridge and along the eastern side of the Ibarra and Quito parks to the summit of Cayambe and then eastward.

On the morning of the 9th of July, after changing our money at the Custom House in Tulcán and receiving the silver currency peculiar to the southern part of Colombia, we left the city and, going northward, were soon on the banks of the Rio Carchi, which we followed, in part on the

highway just being built and in part along the older trail to the "Puente de Rumichaca" (9,020 feet). This is a natural bridge, one of the wonders of this region, and has been the crossing place on this route from time immemorial. The stream gorge is here 100 feet deep and about 40 feet across, but since the natural bridge which spans the chasm is nearly as wide as long, one rides over it without any feeling of danger or insecurity. Its use for wagon traffic, as is planned in connection with the new road from Tulcán to Ipiales, seems quite feasible, both because of its great width and the thickness, at a minimum twenty feet, and the apparent solidity of the natural arch. The best views can be obtained from the top of the cliff just east of the bridge. The upper part of the sides of the ravine are overhanging massive white cliffs fifty feet high, and one uneroded portion of the thick rock layer which forms the cliffs makes the natural bridge—beneath are darker, softer beds, and at the bottom is the turbulent mountain stream coming out of the shadow of the bridge and boiling among the rocks far below.

According to the Jesuit historian, Velasco, this bridge was built by the Incas, which conclusion, considering the massive character and natural origin of the bridge, is only to be regarded as a token of the high regard felt by the Spaniards for the ability of these native peoples.

The Incas' conquest of the tribes north of the Huaca mountain-knot was incomplete at the time of the arrival of the Spaniards, which followed so soon after the Inca invasion of the southern portion of Colombia that here little or nothing had been accomplished in the way of Inca civilisation. Traces of the Inca incursions are found

in a few words, such as "Cocha," which is the Quichua word for "lake," and is applied to the great mountain lake which lies east of Pasto on the eastern slopes of the Andes. The name of the natural bridge across the Carchi is itself composed of two Quichua words "Rumi" (stone) and "Chaca" (bridge), and if Velasco had given the matter a little more consideration, he would perhaps have found the name "The Stone Bridge" a rather singular one to be applied by a people, who had considerable ability as masons, to a bridge of their own making.

Cieza de Leon, who recognised the entirely natural character of this bridge, reports that it was here that he first saw the Inca highway. He also mentions the ruins of an Inca stone fort nearby, and the fact that this was the terminus of the Inca highway, taken in connection with the fact that a tributary of the Guáitara which joins it to the east on a direct prolongation of the line of the Carchi still bears the name of "Angasmayo," suggests that the stream now called the Carchi or "Limit" is the Ancas-Mayu or "Blue River," so frequently referred to by the Spanish chroniclers as the recognised northern limit of the Inca Kingdom, although various battles appear to have been fought north of it with some of the Pasto tribes. In this lies the obscure origin of this singular boundary line between Colombia and Ecuador.

According to the early Spanish explorers, there were on this great Inca highway, which extended through Ecuador, Peru and Bolivia into Northern Chili, some notable masonry bridges, as well as a number of ingenious stream diversions. The method in the latter case was to tunnel through a hill-spur and divert the stream from its normal

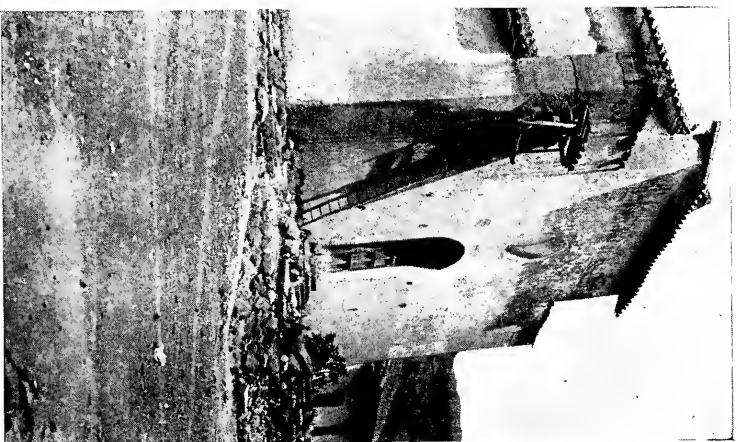
channel through this tunnel. The whole stream-bed was then filled up and the road passed over this pseudo-natural bridge. The same method was adopted by the Spanish, and it is therefore not always possible to say with certainty whether such a "natural" bridge antedates the coming of the Spaniards or is subsequent. We saw one such bridge across the Rio San Pedro, on the cart road to Tumbaco, in our little journeys around Quito. The road surface here is about 30 feet above the stream, the thickness of the natural rock and earth at the crest of the narrow arch is fifteen to twenty feet, and the water flows through a tunnel whose top is ten feet above ordinary water level. It is attributed to the Incas, one of whose main highways is said to have passed along this route. It is used to-day for all the traffic of the country, and while the bridge is composed of natural rock, in place, the opening through which the water flows was cut by man, in which respect it differs from the natural bridge of Rumichaca. Another natural bridge, though not used as a roadway, is reported two miles north of Rumichaca, spanning the Rio Carlosamá, a tributary of the Carchi.

Crossing the bridge, we were again on Colombian soil after an absence of two months. When we sailed out of the magnificent natural port of Cartagena, last May, we little thought that our return would be through the Andes, across the southern boundary and along the general route followed by those who made the first Spanish settlements in the interior of Colombia. At the bridge there is a small building which is the border Custom House of Colombia and here were a few soldiers in uniform.

Following the well-beaten road for about two and a half



An Inca-type "natural bridge" over the
Rio San Pedro, between Quito and
Tumbaco, Ecuador



Belfry of parish church at Tengua, Colombia

miles, we reached the town of Ipiales which is at the same elevation as Tulcán. The Prefect, by special instructions from the President of the Republic, welcomed us back to Colombian soil. Ipiales, formerly called "Pastos," is the southernmost town of Colombia and is on the site of an ancient village which was the chief town of the tribe whose name it now bears. It is the centre of a population of about 15,000 people and vies with Túquerres in being the most important town in the Colombian portion of this mountain-park. It is a town of departed glories, twice the capital of one of the departments of Colombia, at one time for eleven years and again for a few months, it is to-day the capital of one of the eight divisions of the Department of Nariño and is much less of a town than Tulcán with its clubs and smart soldiers and two-storied buildings entirely surrounding the Plaza.

Colombia is to-day divided into departments which correspond to the provinces of which Ecuador is composed. At one time there were thirty-six major divisions in Colombia, called provinces, and at that time Ipiales was the capital of the Province of Túquerres. Now, the term "Province" is no longer applied to the major divisions as in Ecuador, but to the subordinate divisions of the departments corresponding to the "cantons" of Ecuador. These Provinces are subdivided into "municipios," which are of the same relative importance as the Ecuadorian "parroquias." In the Colombian National Census of 1912 the smallest division is the municipio and it is therefore not possible to determine the exact urban population of any village, town or city in contradistinction to the rural population which is tributary to it and under the same governmental division.

We left Ipiales very early on the morning of the 10th of July, but despite the early hour and a gentle rain, a number of horsemen joined us. The hospitality of these people is beyond all praise. As we rode over the hills one of our escorts pointed out the location in the valley below of the famous "Capilla de la Laja" or "the Chapel of the Stone," also called the "Sanctuary of the Virgin of the Stone." Here there is a much venerated picture of the Virgin of the Rosary painted on a smooth rock, to which is attributed such miraculous powers that it is the object of pilgrimages, not only from all of Western Colombia, but from Ecuador and Peru as well. Its fame in Colombia is equalled only by the shrine of the Virgin of Chiquinquirá, sixty miles north of Bogotá. Not very distant from the imposing church which has been built to cover this holy picture, we were told that there was a very beautiful waterfall with a sheer drop of 250 feet on one of the tributaries of the Rio Guátara. This is known as the "Salto del Excomulgado" or the "Waterfall of the Excommunicated One" because of the suicide here, soon after the conquest, of a Spanish priest on whom the anathema of the Church had been pronounced.

Along the road are occasional banks composed of well-defined moranic material, indicating a period geologically not long distant, when glaciers covered this region. A number of the high snow-peaks of the Andes have small glaciers comparable to those of the Alps, but the largest of these on Cayambe does not extend below an elevation of 13,600 feet. As we rode along, we saw a fertile, comparatively well-populated region. The country around El Vínculo had impressed us very greatly with its agricultural

and grazing possibilities, but this country north of the divide is even better. It lacks only easy communication with the rest of the world to make it a perfect human habitation. The more we travel through the high Andean region of Colombia and Ecuador, the more we are impressed with its great potentialities and its but partially developed natural agricultural wealth. It is to-day supporting but a small percentage of the population which it seems capable of sustaining. Its industries yield the meagre amount required for the necessities of the people, but the difficulty of bringing the products to any large market at present precludes full development. The cattle fill but a small percentage of the pastures, there are a few scattered sheep where, with a market for the superior wool they produce, there would be thousands upon thousands and many relatively nearby regions are supplied with grain brought long distances by ship, which these mountain-parks are capable of producing but are excluded by lack of adequate transportation. Owing in large part to this cause, the development of this region has been virtually stationary or even retrogressive for the last century, and it will rise from this period of quiescence to the full realisation of its potentialities, only when a through trunk railway line is constructed, as some day it will be.

Neither Colombia nor Ecuador have the financial resources for the construction of great trunk railway lines, nor would their construction in the present stage of the development of these countries offer a sufficient guarantee of immediate return on the capital invested, to warrant the finding of the huge sums necessary for such undertakings. It might be feasible, however, to find the capital on a land-

grant principle, similar to that which enabled the construction of three great lines of railway across the plains and mountains of the western United States, as well as one across Canada.

The railways in Colombia are almost all built to cater to local needs only—if they are successful, they succeed because of the population already existing—they do not tend to materially add to the population of the country. The great need of Colombia, if she is to consolidate herself commercially and take the place among the Nations of the World which her natural resources entitle her to hold, is through trunk railways—railways connecting the distant parts of the country, railways which the present population cannot support, but which will bring the population necessary to fill the land and create the industries to make it prosperous.

In the first trunk-line across the mountains of the western United States, the Government not only gave lands, but guaranteed the bonds of the company at a generous rate per mile. Colombia has already involved her national credit by subsidies and bond guarantees for railway construction and this plan does not seem best for the country nor is it feasible. The best of the agricultural lands are already held by individuals, and it would therefore be necessary to have the grant include all minerals in the areas which are given to the railway companies.

Since leaving Ipiales, we have been gradually descending and we now reach the banks of the Guáitara, which is the main stream draining the Tulcán-Túquerres park. In its headwaters it is called the Carchi, lower the name changes to the Males and finally the Rio Guáitara. It is here a

rushing mountain stream, 2,000 feet below the main level of the park, but with well-rounded slopes extending down to its very edge, all suitable for cultivation. Here is the little settlement of San Juan, which impresses one as all church and no town. There are three or four small dwelling houses and an enormous, partly finished church, which would seem more appropriate in a town of several thousand. In a few places in Colombia the excessive desire of the priests for "big" churches has rather exceeded the resources and abilities of their parishioners. A friend in one of the Government offices showed me photographs of the foundations of an enormous building, which, he explained, was all that now remained of a considerable settlement. The priest's demands on the labour of his people for the construction of this grandiose dream were so great that finally, in desperation, they migrated one after another to other parts, and the foundations of this church are all that remain to tell the tale.

Immediately below San Juan the river enters a more gorge-like phase and as this region has not yet reached the stage of development warranting carefully graded roads everywhere, the trail ascends a little tributary valley to the prosperous town of Contadero (8,300 feet), possessing a pleasing church, quite in keeping with the size of the town, and then up by steep zigzags to the crest of the hill immediately overlooking the village. From here there is a view of a great expanse of country.

Further along, as it was now well on in the day, our last companion returned to Ipiales and we began the final descent into the valley of the Guáitara. Terrace-form benches of small extent appear along this stream, and across

the main valley, on one of them is the town of Funes. A number of villages in this part of the valley are located at about the same elevation (7,900 feet) and suggest a feeble representative in this park of the second-level observed in the Quito and Ibarra basins.

Late in the day we reached the Hacienda of Capulí, picturesquely situated on a minor bench on the hillside near the junction of the Guáitara and the Sapúyes, which is the main stream of the Túquerres end of the basin. The valley is a mile or more wide near the junction of these streams, and as we have now descended to an elevation of 6,000 feet, it is much warmer and also dryer, recalling the dryness of the Guailabamba and the Chota, and here are irrigated fields of sugar cane. The proprietor of Capulí had arrived only this afternoon from Pasto, where he lives most of the year, and did everything to make us comfortable for the night. He had heard rumours of an impending revolution and had hurried down to his estate to arrange for the sale of all of his cattle as a precautionary measure. One of these days, when the country is bound together with railway lines and the people are not so isolated by the difficulties of communication, the uncertainty in which they now live will cease.

Immediately below Capulí the valley is again contracted and the trail is in many places cut out of the rock some distance above the water-level. On the other bank of the river, we see a well-graded and carefully constructed trail which, we are told, leads to Funes. We cross the river on a suspension bridge, very shaky and very narrow, of which the supporting cables are composed of many strands of barbed-wire bound together, and ascend by a zigzag to a

well-graded track, blasted out of the rock, which after a time turns up the valley of the Rio Guapuscal. At this turn in the road one has an excellent view of the very interesting Guáitara rock-gorge which begins abruptly just below the mouth of the Guapuscal. This gorge is so narrow that it looks as if one could almost jump across it at the top, it certainly cannot be more than 25 feet from edge to edge, and great masses of rock which have fallen down the neighbouring mountain slopes have become wedged in many places between the irregular walls. The sides are so far from the perpendicular and so uneven, that one could not drop a stone from the surface to the water-level 500 feet below, without it hitting the walls in its descent, and a person at the water-level would not be able to see the sky.

This narrow rock-gorge has been selected for the site of the bridge across the Guáitara on the modern wagon-road which is in course of construction between Pasto and Barbacoas near the Pacific coast, a distance of about a hundred and thirty miles, from which place it is possible to go in small boats down the Telembí and Patía and along the coast to the port of Tumaco. The road-grading has been virtually completed from Pasto to this rock-gorge, and from our trail on the south bank of the Guapuscal we see this new road blasted out of the rock of the mountain. We cross the Guapuscal near the little settlement of El Placer, so named from some gold workings in the neighbouring streams, and enter this highway along which we proceed to Pasto. It is a magnificent piece of road engineering rivaling the excellent French road-construction in Algeria.

After coming through Tengua we pass around the southern base of Galera, more commonly called the Volcano of

Pasto, through a great pasture-land and see across a small ravine the town of Yacuanquer (9,000 feet) in the plain at the foot of the volcano. This was the site of the first settlement made by the Spaniards in the interior of Colombia and, originally called "Villa de Madrigal," was abandoned when Pasto was settled and the subsequent town took the older Indian name. Settlements were made on the Caribbean coast of Colombia by the Spaniards as early as 1510 and 1511, but strangely enough, the first Spanish settlements in the interior of Colombia were not made from the Atlantic, but by way of the Pacific and Ecuador, along the route we have just come. The foundation of Villa de Madrigal, Popayán and Cali, all antedate the foundation of Bogotá.

Beyond Yacuanquer we passed through a low gap in the northern rim of the Tulcán-Túquerres mountain-park, at an elevation of 11,700 feet, and entering the valley pasture-lands in which Pasto is situated, began the descent around the eastern foot of the Volcano of Pasto. A few miles from the city we were met by a large party of gentlemen on horseback, including the two British residents of Pasto, Mr. Alfred Hodges and Mr. George Prescott. Mr. Hodges is a British mining engineer, who has lived in Southern Colombia for twenty-seven years and is interested in a number of gold properties in the Western Andes. Mr. Prescott is the manager of the business of Delfin Martinez, which is perhaps the largest mercantile establishment in Southern Colombia. We are under great obligation to them for their hospitality and for much information regarding the region.

Yesterday and to-day, the 12th and 13th of July, have

been spent in Pasto. Lord Murray here received many telegrams welcoming him to Colombia, including messages from the President, the Minister of Foreign Affairs, and the Minister of Public Works. The President particularly expressed the gratitude of the Government to Lord Murray and his companions for undertaking such a journey in order to study the country, which knowledge, he was sure, would result in good to the Nation. Telegrams were also received from residents of Popayán and Cali and it was urged that we should not miss the Valley of the Cauca. Among the deputations received by Lord Murray was one from the Municipal Council asking that he use his good offices to have the firm undertake the building of an aqueduct to the city, as well as other municipal improvements. Other delegations discussed the construction of a railway connecting Pasto with the port of Tumaco, and altogether our two days here have been very fully occupied.

Pasto, the most important town in Southern Colombia, is an old-fashioned Spanish settlement situated in the middle of a broad plain in the mountains at an elevation of 8,430 feet, and the Municipio, of which it is the centre, contains 27,760 inhabitants. Founded in 1539, it received the name of Villaviciosa or San Juan de Pasto, which name signifies "St. John of the Pasture Land." The name was, however, almost at once abbreviated to "Pasto" and the general term of "Los Pastos" is often used in a geographic sense, and most appropriately, to apply to this upland region of southern Colombia. The town is almost square, with numerous well-paved streets intersecting each other at right angles. There are no underground sewers and all the refuse of the town is conveyed in open gutters in the centres of the streets

through which little streams of water flow. The houses are well-built and the town prides itself that most of these are two stories high. The account of the town, published in the report of the 1912 census, even makes special mention of two buildings which have three stories.

In the Plaza, which is prettily planted as a park, there is a statue of the brilliant Colombian patriot, General Antonio Nariño, a native of Bogotá, who was imprisoned by the Spanish authorities for circulating, in the first years of the nineteenth century, a translation of the Declaration of the Rights of Man, as framed by the Paris Convention of the French Revolution, and for which Colombia has given him the title of "Precursor." Facing the park on one side of the Plaza is the old cathedral bearing the royal Spanish arms and the Spanish crown.

Pasto is the capital and chief city of the Department of Nariño, which because of its relative isolation is less in touch with the National Government than any other settled part of the Republic. The inhabitants pride themselves more on their residence in this Department than on their Colombian citizenship, just as the people of Scotland object to being called "English." They are people of force and decision, quite centred in the affairs of their own region, and have resisted for years the introduction of the national currency which circulates in the rest of the Republic, indeed all transactions are in the assortment of old silver coins which forms their unique currency.

There is, naturally, a national Custom House on the boundary between Nariño and Ecuador, but there are likewise Custom Houses on the line between this Department and its neighbour on the north, both in Colombia, and

while this is due to a difference in the duties charged on imports at Buenaventura and Tumaco, the two Pacific ports of the Republic, and is designed to prevent goods imported at a lower tariff through Tumaco from invading the territory more naturally tributary to the higher duty port of Buenaventura, the fact serves to emphasise the independence of Nariño. The people, naturally, would like to be connected by railway with Quito on the one hand, and with Popayán, Cali and the rest of Colombia on the other, but what they really have their heart in, is a railway of their very own, connecting their capital, Pasto, with their port of Tumaco.

Pasto was a royal stronghold in the days of the Revolution and is one of the few regions which stubbornly remained loyal to Spain after the Declaration of Independence. It is even said in the town that there are those who to-day, like the Jacobites of old, quaff a health to the name of "the King across the water."

The currency of Nariño consists of the most wonderful collection of old silver coins in circulation in any part of the world. Nariño enforces a self-made silver standard, whereas Ecuador and the rest of Colombia are on a gold basis, but although Nariño refuses to use the present legal tender of Colombia, she naturally has not issued money of her own, and the currency consists therefore of a heterogeneous assortment of silver coins of all nations, particularly those which are no longer current either because they have been outlawed or because of the establishment of a gold standard, under laws which do not permit the exchange of the old silver coins at their face value. Silver coins of any nationality and any issue are accepted in Nariño at approximately their silver value. They are graded by size and are

reckoned in reales or pesos (dollars) silver basis. The real is considered as 10 cents silver, and the only difficulty which arises with this mass of differing coins is in determining whether a coin shall be considered a 50-cent piece or a 4-reales piece (40 cents), a 25-cent piece or a 2-reales piece, because the old 2- and 4-reales pieces are sometimes rather larger than the newer 25-cent and 50-cent pieces. Usually the figure stated on the coin is accepted. However, if this should be in some other unit, it is fixed by a comparison of size, if an old coin with those of ancient date, if modern, with those of recent date.

The most abundant coins are the old 8-reales pieces of the first years of the Independence, particularly the coins bearing the Indian head and the pomegranate and the words "Republic de Colombia, Cundinamarca, Bogotá," and dated 1820 and 1821. This was the time of "La Grande Colombia" when the country was composed of three great divisions: Cundinamarca (including all the present Republic), Venezuela and Quito. Only slightly less abundant are the 8-reales pieces of the Republic of New Granada, which was the name adopted in 1831 after the Republics of Venezuela and Ecuador became separate nations. There are also five-tenths (50 cents), 20 cents and one-tenth pieces of the "United States of Colombia," which was the name of the country in 1861, some minted at Bogotá and some at Medellín, and varying in fineness from 0.835 to 0.900, and finally the ten-, twenty-, and fifty-cent pieces of the Republic of Colombia, usually 0.835 fine, but in some cases 0.666, which immediately preceded the present issues. The Colombian silver coins prior to 1909 are not exchangeable for gold at their face value and are no longer current in other parts of

the country. The new Colombian silver, of a fineness of 0.900 and exchangeable for gold at face value, is not current in Nariño.

The old silver issues of Cundinamarca, the Republic of New Granada, the United States of Colombia and the Republic of Colombia prior to 1909 form about two-thirds of the Nariño currency. The remainder is made up of old Spanish pieces in circulation at the time of the Independence, of old Ecuadorian, Bolivian, and Peruvian real-pieces and multiples thereof and great quantities of Chilean silver flaunting the motto, "*Por la razon ó por la fuerza.*" In addition there are some Peruvian sols and peseta pieces (which pass for two reales), and occasional coins of other nations. We saw a number of French franc pieces (which pass for two reales), and some silver coins from the United States of North America and Canada; all the latter have holes in them and would not be accepted in the countries of their origin.

A large percentage of the older coins are likewise perforated, some are worn quite smooth, and when this sort of money was offered to us at Tulcán in exchange for Ecuadorian gold and notes we naturally protested and desired to take only unperforated pieces and ones on which the inscriptions were still legible. The supply of such pieces was, however, limited, and we were assured that there would be no difficulty with the coins, whether or not perforated, and whatever their state of preservation, and this was indeed the case. The rate of exchange at Tulcán was \$11.50 silver for one pound sterling, or \$4.86 American.

The present basis of the currency of Ecuador and Colombia is a gold coin of the weight and fineness of the Eng-

lish sovereign. In Ecuador this is equal to 10 sucres, and the country has issued a number of 5- and 10-sucres gold pieces which are however relatively few in number compared with the English sovereigns in circulation. In Colombia English gold is used almost exclusively.

The Colombian Government, finding that Nariño paid no attention to the national law requiring acceptance of the modern Colombian silver and paper, has sought to make a beginning in currency reform by introducing gold. This is effected by paying the troops in sovereigns and providing that each of these sovereigns will be received by the Government in payment of custom duties at the rate of \$12.50 silver. Under this inducement the merchants of Pasto readily cash the soldiers' sovereigns at the prevailing rate of \$11.50 and then repay them to the Government at the enhanced rate. There is thus some gold in Pasto and on the coast, but in the smaller towns of the Department most merchants still refuse gold. The inhabitants of the country will not accept it in payment for goods delivered to the merchant, and he finds it only a source of annoyance, as he must carry it to Pasto or to the coast to get its value! Naturally under these conditions the one Bank of the Department, the Banco del Sur of Pasto, reports its capital, deposits, etc., in silver money.

During our stay in Pasto we have visited several of the little manufactories of the famous Pasto wooden bowls. While in Quito I found, in some of the native shops, wooden bowls commonly eight to ten inches in diameter and two to three inches deep which are of a dull red colour and decorated on the inside with various designs in blue, yellow and gilt, the whole covered with what I took to be a sort of

varnish. I thought they were of local manufacture—for show rather than use—and was surprised to learn that the coating was of such a character that the bowls would serve for all the purposes for which plates or dishes are used, and as they are not so liable to break they are much sought after by the natives. I was also informed that they were not made locally but came from Pasto, which was the only place where the peculiar gum with which they are covered could be obtained. Along the trail from Quito we passed several cargo-trains on their way south carrying loads of these bowls, which, we were informed, were sold even far to the south of Quito. Here we learned that the demand extends over a wide area, even to Popayán and into the upper Magdalena Valley.

The coating of these bowls is the “Barniz de Pasto,” the product of a woody shrub belonging to the Rubiaceæ, which also includes the Madder. This shrub does not grow at the elevation of Pasto, but in the neighbouring, warmer regions. According to the noted Colombian botanist, Santiago Cortés, it is found throughout the Republic, and its product is called “cera” in the region of Sumapaz, near Bogotá, and “lacre” in Socorro and Antioquia. It is, however, most generally known by the name “Barniz de Pasto,” as it is only in this locality that it is used to any considerable extent.

Through the kind offices of Mr. Prescott we have secured two saddle horses of sturdy mountain stock, with a great reputation as hill-climbers. The Indians who accompanied us from Quito have returned and have been replaced by one José, a black-eyed, black-haired, black-moustached, energetic individual of the old pirate type, who is supposed to know

every inch of the trail for many miles. We are warned that while very faithful and loyal, he is rather fond of "aguardiente." And so everything is ready for our start in the morning for the seven- or eight-days' journey to Popayán.

FOUR

PASTO TO CALI



Cali,
Departamento del Valle del Cauca,
Colombia.

28th July, 1913.

FOR the past two weeks we have been travelling through the great valley-plains which lie between the Cordillera del Chocó, or Western Andes, and the Cordillera del Quindío, or Central Andes. When these two chains finally disentangle themselves from the knotted mass of mountains comprising the single chain, in whose complex top there are the high mountain-parks of Southern Colombia and Ecuador, they continue northward for some distance as relatively simple parallel ranges whose crests are 40 to 50 miles apart. Between these there is, first, the steep broken land sloping down from the rim of the northernmost park, and then a great plains-region, somewhat dissected by stream erosion, elevated well above sea-level, but still much lower than the high mountain parks. This has a uniform width of twelve to fifteen miles and, bounded on either side by the steep slopes of the mountains, extends northward for 250 miles. Here the plain-lands end, and though the two ranges still continue northward, they lose the simple single ridge character and become rather more complicated and the depression between is broken by spur ranges from the main chains. In this region the Central Andes loses its height and becomes a complex broad upland, relatively well populated. The third and last phase of the depression between the two

ranges is a low-lying river valley bounded on either side by the gradually disappearing ridges of the central chain and a low spur of the western range, and then becoming an indistinguishable part of the great Magdalena interior-delta plain.

The three great physiographic provinces between the Cordillera del Chocó and the Cordillera del Quindío are thus:—

First—The inter-mountain plains of the present Departments of Cauca and Valle del Cauca which occupy the first 250 miles of the depression.

Second—The region of hills and valleys which lie between the two chains along the Cauca River in the Departments of Caldas and Antioquia. The Cauca River, after traversing a portion of the southern plains, flows in this second division of the inter-mountain depression through a series of gorges.

Third—The river-plain of the lower Cauca, in north-central Antioquia and southern Bolívar, which, bounded by the gradually disappearing spurs of the mountains, soon amalgamates with the great low plain of the Magdalena River.

The southern plains area of this inter-mountain depression is divided into three parts: the Plain of the Patía, the Plain of Popayán, and the Plain of Cali. The Plain of the Patía occupies the southern quarter of this area, the Plain of Popayán the next quarter, and the Plain of Cali the northern half. The last is thus about 125 miles long and 15 miles wide.

Of these, the plain of Popayán, with a mean elevation of about 6,000 feet, is the highest, and contains the divide be-



VALLEY PLAINS OF WESTERN COLOMBIA

Based on the relief model by the Colombian artist,
Sr. José Miguel Rosales

tween the waters of the Atlantic and the Pacific. However, there is no marked hill mass between the two drainage basins, such as we had inferred from published maps and accounts, and one of the surprises of the journey was to find that in the Plain of Popayán we had crossed from the tributaries of the Rio Patía, which flows into the Pacific through a great gorge in the Western Andes at the very southern end of the Plain of the Patía, to the tributaries of the Rio Cauca, which flows into the Atlantic by way of the hill country of Antioquia, without having appreciated that we had passed across the hydrographic divide between the two oceans. One would naturally expect in the Andes of South America that the divide between two great river systems, tributary to different oceans, would be a marked mountain crest, and it is perhaps this wholly natural preconception which has led to the showing on a number of maps of such a mountain range across this plain between the head-waters of the two streams and has caused rather misleading statements in many geographic descriptions.

We found the divide to occur here in a rolling plain where the low elevation between the two river systems is of less topographic importance than the elevations between certain tributaries of either river. Looking across the plain from either of the mountain slopes, it would be impossible to say with certainty, in many cases, which little tributary belongs to the Cauca and which to the Patía. The line of this inter-oceanic divide crosses the plain of Popayán in an east-west direction. On the west it mounts to the summit of the Western Andes and then turning abruptly northward, follows it very closely on the western side of the plains area; while to the east it climbs the other chain

and, turning abruptly south, follows the summit of the mountains on the east side of the Popayán and Patía Plains.

There is in this general plains-region the suggestion of a remnant of a cross-range, but it does not lie between the Cauca and Patía drainages, but near the northern end of the Plain of Popayán, and a number of miles north of the head-waters of the northward flowing Cauca. It is somewhat near the boundary between the Plains of Cali and Popayán, but the separation of these into distinct units rests on a marked difference in elevation rather than on this feature. Perhaps at one time in the geologic past this remnant of a cross-range was an important feature in the drainage systems of this region, and while it is certainly not so to-day, its presence adds but another feature to the physiographic history of the Cauca River, which will some day be unravelled.

The Plains of Cali and Patía lie some 3,000 feet below the Plain of Popayán, and the latter is therefore deeply trenched towards its northern and southern borders by the streams which cross it on their way to these lower levels. The Plain of Cali has suffered very little erosion. It is slightly concave, sloping up to the mountains on either side, and between its southern end, thirty miles south of Cali, and its northern limit, near Cartago, it has a slope of about four feet per mile, and may be regarded as a plain between 3,000 and 3,500 feet above sea-level. The Cauca River flows through the Cali Plain from end to end, and the levelness of the land, together with the gentle rainfall and the healthy warm character of the region, have all combined to cause it to be regarded as one of the garden spots of Colombia. When a Colombian affectionately refers to the

“Valley of the Cauca,” or simply to “The Valley,” he means, not the great drainage basin of the river, but merely this particular level portion of the valley which I have called the Plain of Cali. I was very much mystified in Bogotá when an engineer and geographer corrected a chance remark that Popayán was in the Cauca Valley, with the unqualified statement that it was not. As all of the maps show this City in the drainage of the Cauca River, as indeed it is, I naturally concluded the statement had been carelessly made. It now appears, however, that he was using the name “Valley of the Cauca” in the peculiarly restricted sense just mentioned, and it is to avoid this confusion, rather than in any attempt to establish the use of a new term, that I shall use the equally descriptive and more exact designation of the Plain of Cali for this one part of the great area which in an ordinary geographic sense constitutes the Cauca Valley.

The local and restricted usage of the words “Valle del Cauca” (Valley of the Cauca) have found expression in the name of the Department created in 1910 of which Cali is the capital. The new Department includes all of the Plain of Cali except a small portion to the southwest, together with a strip extending across the Western Andes down to the Pacific Ocean, and including the Port of Buenaventura, which has since the beginning of the written history of this country been a sort of commercial appendage to Cali.

The Plain of Cali has many of the aspects of an old lake basin rather evenly filled with detritus washed down from the surrounding mountains, and it is generally attributed to such an origin. The City of Cali is slightly above the level of the Plain on an alluvial fan of gentle inclination

formed of material brought down by a tributary stream. The ponding of the water for this lake-stage might have been produced by a damming of the valley below Cartago with volcanic material from some of the old craters of the Central Andes or by local deformation of the strata, but the fact that the level of the deposits in the Plain of Cali corresponds very closely with the upper level of the Plain of the Patía, to which a similar lake-origin has been ascribed, rather suggests the possibility of a great subsidence of the country during which these deposits were laid down in bays or arms of the sea. This would involve a subsidence and uplift of this region in relatively recent geologic times of 3,000 to 4,000 feet.

The Patía Plain has a mean elevation of about 3,500 feet, and like that of Cali it slopes up to the mountain, but unlike the latter it is deeply trenched by the streams which cross it, as would naturally be expected owing to the relatively short distance which the Rio Patía travels through the western mountains in reaching the sea. The maximum depth of the depressions below the upper level of the Plain is similar in amount and character to that in the northern and southern edge of the Plain of Popayán, that is to say, 1,000 to 2,000 feet. The lowest portions along the stream valleys are thus 1,500 to 2,000 feet above sea-level, and these lower portions of this section are quite warm. The Patía Valley has a very evil reputation from the standpoint of health as compared with its sister plain of Cali, much worse than other regions of the country with an elevation lower than even its lowest parts. Perhaps this is in a measure due to the fact that in early days negro slaves from the gold workings along the coast on the lower Patía, and its

tributaries, found it easy to pass up this river, and so have settled and lived in this section for a long period without any regard to the laws of hygiene. The white population of the Andes, as a whole, is really very small compared with the agricultural possibilities and the area of the country, and it is not very surprising that this region, where no systematic endeavour has ever been made to safeguard the health of the people, should in time grow to have a bad reputation. Most of it is, however, very excellent pasture land. It is warm, but owing to the low rainfall there is no tropical vegetation to fight. The soil is reputed not to be so good as in the Popayán and Cali Plains, but judging from the character of the sugar cane we saw growing without any attention or cultivation in small spots where it could get a little extra moisture, we are rather inclined to regard the matter as not lack of fertility so much as lack of systematic cultivation and irrigation, for which purpose the streams that could be made available by modern engineering would furnish an abundant supply. On the whole, from a necessarily cursory examination, we are inclined to believe that in the fulness of time, when this section becomes really accessible in a commercial sense, the Patía Valley will outgrow its present reputation and become one of the prosperous regions of Colombia.

All three plains are in a rain-shadow cast by the western mountain range, and the distribution of the rainfall follows much the same law as that suggested by the facts observed in the mountain-parks, namely, that the amount of rainfall varies inversely with the depth below the bordering mountain-rim, thus the lowest portions of the Patía have least

rainfall, the amount increases in its upper portions and in the Cali Plain at the same level, and is greatest in the Popayán Plain, which is least depressed.

The heights of the chains of the Andes on the two sides of these Plains are very dissimilar. The effective elevation of the Western Range, so far as it influences rainfall distribution, is about 8,500 feet, while the Central Range is about 13,000 feet, with a number of permanently snow-covered peaks rising to a much greater elevation. The height of this last range is such that these plains can receive no rain from the east. The precipitation is therefore wholly dependent on winds from the west. These saturated winds coming from the Pacific are first forced to ascend the Western Andes, and from sea-level to the very crest of the mountains there is a moisture-dripping jungle-forest. Surmounting the summit the moisture-laden winds give only gentle rain to the intervening slopes and valley. The forest-growth stops short as if cut by a knife at the very crest of the range, and the slope toward the plains is barren of trees, but when these winds strike the higher mountains on the eastern side of the plains they are again forced to ascend and yield their remaining moisture, and this gives rise to two things, firstly, there is produced on this western side of the Central Andes a tree-belt which extends from the corresponding level of the summit of the Western Andes, that is, about 8,500 feet, up to the Paramo line, and has points of forest-growth extending down the stream channels toward the plains below, and, secondly, almost all the important streams which flow into the plains come from these mountains and, as a result, the master streams of the Valley of

the Patía and the Cauca are forced over to the western side of the plains.

The two dominating cities in this series of inter-mountain plains are Cali and Popayán, and, as is common between cities in the same general region with differing claims to greatness, there has been no little rivalry between them, assuming an aggressive form in the more commercial of the two which proves rather amusing to the more philosophic.

There is even a question as to which is the older city, both representing foundations older than any others in the interior of Colombia which have survived continuously to this day. Before they were established there were attempts at foundations at six points on the Caribbean shore of the Atlantic Ocean, two of the settlements had ceased to exist even before the foundation of Cali and Popayán, which cities were established not by expeditions from these settlements on the Caribbean, but by those which came by way of the Pacific and through Peru and Ecuador. It was Sebastian de Belalcazar, the Conqueror of Quito and the founder of the Spanish city at that place, who was responsible for the first permanent conquest in the interior of Colombia and for the foundation of these two cities. Sending his Captain, Juan de Ampudia, and his Lieutenant, Pedro de Anasco, early in 1535, he followed in September of that year as far as the place where Cartago now stands. They advanced after many bloody battles with the Indians—the conflict for the Popayán locality alone resulting, it is said, in the death of twenty thousand.

In this campaign, late in 1535, a settlement was established some miles south of what is now Pasto, called Villa

de Madrigal, but it was abandoned in a few years. The next settlement was established some miles from the present site of Cali on the 25th of July, 1536, while Popayán was founded on its present site in December of that year. There is thus this grain of truth in the pointed statement of the gifted son of Cali in his résumé of her history, in the report of the 1912 census of Colombia, published in Bogotá in the same year, that "Popayán was founded six months later."

Cieza de Leon, who reached Cali about 1538, however, fixed the date of the settlement on the present site as 1537, in which he is in a measure corroborated by Pascual de Andagoya, a less careful chronicler, who fixes it in 1538. The first town, and the one to which we are inclined to think the date of 25th of July, 1536, applies, was founded in the "midst of the Indian villages of the plain," whereas, as Cieza de Leon very correctly says, the present town is on a platform above it. The first settlement is regarded by the authorities of Cali as having been on the banks of the Jamundí, which is 14 miles south of the present site. In some of the early chronicles this first settlement is called Cali, in others, Ampudia. The name of the present town is derived from a corruption of the spelling of the Indian word Lili or Lile, and its full name, as expressed in the Royal Warrant creating it a "most noble and loyal city" and granting it a coat of arms, was "Santiago de Cali."

On the whole it would seem that the foundation of the present Cali was subsequent to Popayán, and the list of the Colombian towns and cities which have persisted to the present day is therefore in the order of their foundation as follows:

Dates of Foundation of early Colombian Cities.

Santa Marta	1525
Cartagena	1533
Tolú	1535
Popayán	1536
Cali	1537
Timaná	1537
Bogotá	1538
Pasto	1539
Tunja	1539

Of these Popayán, Cali, Timaná (which is in the Upper Magdalena Valley) and Pasto represent foundations made by way of the Pacific and Ecuador, while Bogotá and Tunja were founded by an expedition coming from Santa Marta on the northern coast.

Although Belalcazar undertook this conquest as a subordinate of Pizarro, his ambition caused him at once to claim it as his own, and after a trip to Spain he was confirmed in his claim to the governorship of the whole of the Province and returned to his capital city of Popayán late in 1540 or early in 1541. Cali lays claim to having been the first seat of the Government of the Province of Popayán, but this appears to rest on no better authority than that of the historian Velasco. Even before the governorship was confirmed to Belalcazar by the Spanish Crown the seat of Government of the newly conquered region was at Popayán, for we find that it was here, in 1538, that Vadillo, who numbered among his followers the careful author Cieza de Leon, found Aldaña the Governor appointed by Pizarro in Belalcazar's absence.

On account of the manner in which this region was conquered the relations of the cities of this Province were with

Quito and the south rather than with Bogotá and the "Nuevo Reino de Granada," founded as a result of the expedition of Quesada. Some years later, in 1563, the Presidencia of Quito was established, comprised of the Province of Quito, that is, modern Ecuador, and the Province of Popayán. The latter then extended from the junction of the Nechí and the Cauca rivers, in what is to-day northern Antioquia, to the present boundary of Ecuador, and from the Pacific Ocean to the Amazon and Orinoco rivers. It touched the Magdalena River for 170 miles below the mouth of the Rio Negro and, in the district of Chocó, extended up to the banks of the Rio San Juan. The capital city of this enormous area was Popayán. It was the seat of the civil and church governments and the centre of wealth and culture; here was the Governor and his staff, the Bishop, and other officials of the Administration of the Church; here was a royal mint, and here lived the owners of the rich gold mines of the coast and the mountains.

Cali was, during this period, but one of the cities of the Province, although a growing and pre-eminently a commercial one, thanks to its location near a low pass in the western mountains which by singular good fortune was proved, after the city's foundation, to lead to the excellent harbour of Buenaventura, discovered by Andagoya in 1539, or two years after the foundation of Cali. Thus by accident this city found herself in command of the route to the best harbour on the western coast of Colombia.

With the final creation of the viceroyalty of Santa Fé, the Presidencia of Quito came nominally under Bogotá, but the immediate centre of the civil administration of all this western and southern portion of the present Colombia

still remained at Quito, and the Church affairs were left as before in the ecclesiastical domain of Peru and did not come under the control of the Metropolitan Church of New Granada, that is, Bogotá. It is therefore by no means surprising to find that when, in 1830, Ecuador separated from the original Republic of Colombia, which was composed of the present nations of Venezuela, Colombia and Ecuador, this western and southern portion of Colombia adhered to Ecuador and was only returned to Colombia after a short war between the two nations, by the treaty of the 8th of December, 1832.

In the war of the Independence Cali at once pronounced in favor of the patriots, but Popayán, by reason of the connection of many of its principal families with the Spanish Government, was not so ready to embrace the new ideas. The patriots of Cali, with forces sent from Bogotá, marched upon Popayán, defeated the royalist forces in the battle of Palacé on the 28th of March, 1812, and entered the city. It changed hands many times during the next eight years, but the activity of Cali in the "Great War" caused Bolívar to issue on the 11th of May, 1820, a decree declaring that whereas "the best and principal part of the Province of Popayán" was composed of settlements located in the warm "Valley of the Cauca," and that this town had made great sacrifices for the liberation of the country from the dominion of the King of Spain, the Province should thereafter be called the Province of Cauca and its capital should be the city of Cali in recognition of the signal services of this town to the Republic.

The Department of Cauca was established by law on the 8th of October, 1821, but Cali does not appear to have re-

mained the capital city for any considerable time, as Col. J. P. Hamilton, who was the Chief of the Commission sent by the British Government to the Republic of Colombia in 1824, found Popayán the capital and seat of the Governor of this Department.

In the history of Colombia there have been many changes in the size, shape and names of its major political divisions, but during most of this period Cali has been a town in the division of which Popayán was the capital. The exceptions cover two periods, during one of which Cali was the capital of the Department of Buenaventura, and during the other of the Department of Cali, and at the same time Popayán was likewise the capital of a Department. Since 1910 Cali has come into her own and is now, most appropriately, the seat of the Government of the Department of the Valley of the Cauca, while Popayán is the capital of the much-shrunken Department of Cauca, which has retained the old name that once covered all of western and southern Colombia.

Outwardly the two cities are to-day much the same, although Cali has perhaps twice the population of its old rival. Each is composed of buildings of the usual white-walled, red-tile-roofed type, and each has notable churches in the old Spanish style of architecture, but in inherent spirit they are very different. In Cali there is the feverish hurry and jostle of modern business. Its whole life has been a commercial one, and now that the long-deferred hope of a railway connecting it with the port of Buenaventura is rapidly approaching realisation—some say that in six months the first train will run from Cali to Buenaventura—the price of real-estate is mounting rapidly, and everywhere there is

the exuberant spirit of a boom town. It seems not a little appropriate that our own apartments are here in the "Grand Club," which, reflecting the restless commercial spirit of the town, is never still.

The contrast with the peaceful house which was placed at our disposal in Popayán is very great. Popayán has the quiet and peace and dignity of an old university town where the scholar and poet can follow his thoughts undisturbed. In Popayán preparations had been made that we would at least spend a week in the city, and would then go on a round of visits to the large and delightful haciendas of the principal families, and the announcement that we must hurry was not considered altogether satisfactory. On the other hand, the statement here that we can allot only two days to Cali is accepted without protest, not that the inhabitants of this place are any less hospitable than those of Popayán, but merely that their point of view is different.

The southernmost metropolis of Colombia, Pasto, is given in the 1912 census as having a population of 27,760 or 13 more persons than Cali, but the comparison seemingly afforded by the census is by no means an exact one, as the population given is that of the Municipio or smallest political division of which the town named is the seat of local Government and may include a very large percentage of rural population. Pasto impressed us as a much smaller city than Cali. Though much less commercial than Cali it is more so than Popayán, but lacks the charm of the old university atmosphere.

Our departure from Pasto had been fixed for early on the morning of the 14th of July. We had been advised by friends at Quito that we should carry provisions from Pasto

for the seven days' journey to Popayán, as there would be little opportunity of replenishing our stores en route. Telegrams were accordingly despatched stating the time we expected to arrive at Pasto and asking that a supply of bread and cooked meat and chickens be prepared for us. When our schedule was altered, owing to longer stoppages than contemplated at interesting points, we telegraphed, giving the change in the date of our arrival and stating we would spend two days in the city, naturally expecting that the cooking of our provisions would be done while we were there. On our arrival we saw the individual who had been communicated with, and having asked him if everything would be ready for our start on the 14th, felt quite satisfied with his answer.

When, however, we came to start we found that the food had been cooked according to the original programme and that we were starting on a week's trip with perishable provisions already seven days old! We hurried round the city in an attempt to secure tinned meats, but all we could obtain were three or four tins which had found their way here as samples! Fortunately the store of provisions we had brought from Quito was virtually untouched and our subsequent experience showed that some supplies could be obtained en route.

Finally we got under way about noon, and notwithstanding the drenching rain, the Acting Governor, Señor Angel Martinez Segura, and General Jimenez, the Commandant of the Forces, as well as several other gentlemen, insisted on escorting Lord Murray for the first few miles of the journey. Crossing the small stream called the Rio Pasto, which flows along the northwestern side of the city, we were

soon across the little plain in which Pasto is situated, and began the steep ascent of the range which bounds this valley on the north. This is generally referred to as the Alto Aranda and rises some 2,000 feet above the city or over 10,000 feet above sea-level. It was on these heights, as we were informed by one of our companions, that General Nariño, who had advanced here after defeating the royalist forces at several points to the north, was captured, and he thus entered the city, which was afterwards to become the capital of the Department named in his honour, as a prisoner of the forces of the King of Spain.

We were much disappointed that the inclement weather prevented our having a good view of the Volcano of Pasto. Along the route which we had followed in coming from Ipiales, we did not at any point obtain a comprehensive view of this conical mountain, and not much of it is to be seen from the town of Pasto itself, but we were told that when we started on the route north we would, from these heights, obtain a view which would entirely satisfy us. Of the several elevations which have been determined for the summit of this mountain, that obtained by Reiss and Stubel is accepted by the Colombian geographer Vergara as the most accurate. This gives to the peak an elevation of 13,986 feet, and its summit thus towers 5,500 feet above Pasto. Although the top is from time to time covered with snow, its altitude is not sufficient to give it a permanent snow-cap. The last eruption of this volcano was in 1727, and it still discharges a little steam and gases. Even during the great earthquake of 1834, which virtually destroyed the city, it is reported to have shown no increase in activity. Cieza de Leon, writing in the middle of the XVIth century, describes

it as "a volcano which sends forth quantities of smoke at intervals, and in times past the natives say it threw out volleys of stones."

The road for the first few miles from the city is not in a very good state of repair—it is old and unimproved—but beyond this point and extending to the Mayo River, which is the boundary line on the route we followed between the Departments of Nariño and Cauca, the road is noteworthy both for the excellence of its construction and the engineering skill with which it has been laid out. In many places the location is entirely new, and this is particularly true of the high ground, of a paramo nature, which extends from the heights above Pasto for a number of miles toward Buesaco. From the character of the vegetation on this elevated ground we should say that this locality is so situated with reference to the prevailing winds that it receives a much greater rainfall than the town of Pasto. The surface is covered with a peaty vegetable muck two or three feet thick, and this thickness is independent of the slope of the hill. Here good trail-making is by no means an easy or simple task, but the energy and skill with which this sturdy independent mountain people of Nariño have attacked the problem within the last few years is very much to their credit. The Department of Nariño was only established in 1904; it lapsed for a short time in the multiple divisions of the Republic made in 1908, but was re-established on a firmer footing in 1909. Its first care, as a separate political division of the country, was to improve the means of communication between its distant parts and Pasto, and between Pasto and the port of Tumaco on the Pacific coast, improving and rebuilding in the last six years over 823

kilometres of trail. We have already noted the important cart-road which is being built to connect the capital with the sea, and which, in much of its route, replaces only recently improved mule-roads, and we have had the opportunity of passing over the many notable improvements between Pasto and the northern boundary of the Department.

This progressive spirit is all the more marked because of its contrast with that in the Department just to the north, of which Popayán is the capital. When we passed across the Rio Mayo into the Department of Cauca, we found we had left the region of improved roads—where the primitive ones had been relocated with modern engineering skill and, where necessary, had been blasted out of the walls of the gorges—and entered a region in which the ways of communication were but little more than “cattle-paths.”

At Popayán there are two rather pretentious cart-roads of modern construction, one leading northeast and the other southwest from the city, both extending about four miles and then ending abruptly and serving no particular purpose other than possibly satisfying the inhabitants of the capital city that they possess cart-roads. In contrast with this, the practical people of the south have directed their energy to the improvement of the more distant trails. The old roads near Pasto will be improved in time, but the people very correctly say that more practical results can be obtained by improving the worst portions of the roads first, as, for example, that leading over the rain-drenched, elevated ground immediately north of the city.

In these mountains we were surprised to see great numbers of large and beautiful tree-ferns. We had always supposed that the tree-fern was one of those survivals of past

geologic time peculiar to Australia and New Zealand, and we would, on account of other preconceptions, have been less surprised at finding them in the lower warmer regions than in this situation 9,000 to 10,000 feet above sea-level. Here again we saw deposits of probably glacial origin similar to those at the same altitude near Ipiales.

The rain which had hampered our start was but a shower that passed away when there was no longer any possibility of our seeing the volcano, but still soon enough to enable us to fully enjoy this tree-fern forest with its innumerable pink ground-loving orchids. If there were ever any of the glorious orchids with which imagination clothes the Tropics, they have been collected from this long-established trail.

Buesaco is a small village of a few hundred inhabitants 20 kilometres from Pasto, and consists of one long, narrow street on the top of a ridge at an elevation of 6,560 feet. Arriving here just before nightfall, we applied to the Alcalde for a place to spend the night. The usual stopping place to which we were first conducted was not exactly a paragon of cleanliness, and we finally secured a building which was just being completed, and so had not been occupied. In this we piled our belongings and opened and set up our folding beds on the great clay floor, while the arrieros drove the animals into a nearby field for the night.

There are two routes usually followed between Pasto and Popayán; one keeps up along the slopes of the mountains through a number of settlements and is known as the route "Por los Pueblos," while the other passes through the Plain of the Patía, and is known as the way "Por el Valle del Patía." The former is the rougher and longer of the two, but is generally followed when the stage of the water in the

Dos Rios, a tributary of the Patía, which must be crossed on the route through the Patía Plain, is such as to make crossing dangerous. Had we been going "through the villages" we could have turned to the right at Buesaco the following morning and proceeded toward El Tablón and La Cruz, but as we had been advised that we could make quicker time by La Union and the Patía, we turned to the left and followed along the excellent "Camino," which we soon saw stretching before us as a white-line of easy gradient, chiselled out of the rugged side of the mountains, with the waters of the Juanambú in a narrow rugged mountain-enclosed valley 2,000 feet below. After a few miles the road begins the main descent to the river by a series of switch-backs blasted out of the face of the mountain. The old zigzag, which this new one replaces, would in much of the Andes through which we have passed have been considered quite good enough, but it was very steep, and the progressive people of Nariño finding that it could be improved, did so.

The Juanambú is crossed by an excellent masonry bridge, 4,000 feet above sea-level, built only a few years ago and called the "Puente de Socorro" or "Bridge of Socorro." Immediately above this bridge the river passes through a very narrow rock-walled gorge, perhaps half a mile long and several hundred feet deep, which would make an excellent dam-site. Beyond the bridge the trail divides, one branch going up the valley in an easterly direction, and our arrieros told us that in going by the route through the villages, on account of these new improvements, they would prefer to cross the Juanambú by the Puente de Socorro and take this trail up the valley which strikes the main way to

La Cruz somewhat to the north of El Tablón. The other branch of this trail follows the valley westerly, and gradually ascends the mountain on the north side until it reaches a little settlement called "Cañada," where it turns northward into a tributary valley. The old bridge across the Juanambú was just below Cañada, and so about four miles below the Puente de Socorro, and it was near this old bridge that General Nariño defeated the royalist forces in 1814 during his march on Pasto, which ended in his capture on the heights to the north of the city and his entering it as a prisoner in chains.

From the turn of this road near Cañada one has a very comprehensive view of the great grass-covered terraces, underlain by conglomerates composed of volcanic materials, which tower above the Juanambú on either side, and here, having an elevation of 5,000 feet, slope to the westward. Three miles beyond Cañada is Berruecos, situated in a mountain valley, 7,300 feet above sea level. This is a much neater town and a more thriving-looking community than Buesaco, and it was in the nearby mountains that General Sucre was assassinated on the 4th of June, 1830, as he was leading the Colombian forces against Ecuador in connection with that country's claim to the western and southern part of Colombia after its secession from "La Grand Colombia." It was to Sucre more than to any other that Ecuador owed its independence, and the acknowledgment of gratitude to him found expression in later years in the name given to its monetary unit, the "sucre" (two shillings—about half a dollar), even as Venezuela recognised "The Liberator" in the name of its unit, the "bolivar" (ten pence or one franc—about 20 cents American). It is one of those singular

The valley of the Juanambú, between Pasto and La Union, Colombia

A NARIÑO TRAIL



turns of fortune that General Sucre, who, on the 22nd of May, 1822, won the battle on the slopes of Pichincha, near Quito, which finally destroyed the Spanish power in Ecuador, should only eight years later be marching against that country at the head of a Colombian army (not because Ecuador had seceded, but because the southern and western part of Colombia had joined it), and should meet his death at the hands of an adherent of Ecuador. Such an incongruous happening is by no means peculiar to any one country of the world, the gratitude of a nation is not always lasting, and in every nation and every section there are necessarily differing views as to what is best for the country.

Beyond Berruecos we ascend the Montaña de Berruecos, in which there is a little valley marked "Los Muertos" on a map prepared by the Colombian geographer, General Francisco Vergara, and this is probably the site of the death of General Sucre. The road then begins the descent to La Union, which is reached after passing over a spur called "Cerro Alpujarra." La Union is situated on the slopes of the mountain toward the River Mayo at an elevation of something like 5,000 feet, and is a progressive and prosperous town of well-built two-storied houses, the centre of a thriving Panama hat industry and of a population, according to the 1912 census, of 9,139 people, although we should say that the town itself certainly does not contain a quarter of that number.

We reached the town about 6 o'clock in the evening of the 16th of July, and would have arrived much earlier had we not lingered at the Bridge of Socorro to enjoy the rugged mountain scenery, and been tempted by a clear little moun-

tain stream, with deep pools, to enjoy a bath in its cold and refreshing water. Lord Murray had a very finely woven Panama hat which he had purchased in a shop in Jermyn Street before leaving home, and when this was examined by the Prefecto, who was one of the Panama hat experts of the town, he unhesitatingly pronounced it, from the nature of the weaving and certain peculiarities of the fibre with which he was familiar, as undoubtedly a product of La Union, and it might be added that the retail value of this hat in London was not very different from the retail value of a hat of similar quality at the place of origin.

La Union is the northernmost town of the Department of Nariño along this route, and one must change his Nariño currency here—or at Mercaderes, the corresponding town in the next Department, 20 miles distant—for the currency of the rest of Colombia. The rate of exchange varies considerably between La Union and Mercaderes, and as we had been informed at Pasto that the rate at La Union was for the moment better, we exchanged the greater part of our money here. It was, however, necessary to retain some of our Nariño silver, as our present lot of *arrieros*, being natives of Pasto, insisted that when we reached Popayán, the terminus of their route, our account with them must be paid in the silver current in Nariño!

The money of the Colombia of to-day consists of notes and silver based on a gold coin of the weight and fineness of the English sovereign, which has a value of \$5 gold or 500 paper pesos. The paper peso is thus equivalent to one cent or a halfpenny. The paper money is commonly of the denominations of 50 pesos (50 cents), 100 pesos (\$1) and 1,000 pesos (\$10), though we received a few of lower de-

nominations, notably one peso, which are, however, no longer being issued. The origin of the present seemingly anomalous equivalent of the paper peso to the cent is found in the reckless issue of unsecured paper money, particularly during the Revolution which extended from 1898 to 1903. This was an era in which money was pre-eminently "made with a printing press," and the value of this fiat money rapidly dropped until at one time two and six-tenths (2.6) paper pesos were required to make the value of one cent. The legal equivalent of the paper was, however, finally fixed at the present value, and the work of the Junta de Amortización, and more particularly of its successor the Junta de Conversión, charged with the redemption of the paper and its exchange for new notes and for the new nickel and silver issues which are redeemable in gold, has established the new meaning of the word "peso paper" to be "one cent."

The modern nickel coins of Colombia are "1 peso p/m." (1 cent), "2 pesos p/m." (2 cents) and "5 pesos p/m." (5 cents), all bearing a head of liberty on which there is the almost indistinguishable word "Paz" (Peace). The silver pesos are of a fineness of 0.900, in which they differ from the baser coins of the immediately preceding issues (0.835 and 0.666 fine), and have values of "diez centavos" (10 cents), "veinte centavos" (20 cents) and "cinquenta centavos" (50 cents). These new silver coins, being exchangeable for gold at their face value, do not circulate in Nariño, where all coins pass for approximately their actual bullion value.

What with exchanging money and the kind insistence of our hosts that we must have déjeuner, we did not get away from La Union until 12 o'clock on the 16th. The trail

gradually descends to the Mayo, which is crossed by a picturesque old masonry bridge at a point where the stream emerges from a very narrow rock-gorge several hundred feet deep, cut in a hard conglomerate stratum. We managed to go a little way up this canyon along a ledge, and saw a small cataract in the stream and heard the noise of a much larger one which we presume was the "Salto del Mayo," which is described as a cataract with a fall of 65 feet.

The Mayo has been regarded by a number of writers as the "Ancas-mayu," or Blue River, of the early chroniclers. It, however, seems to us that the Ancas-mayu of these accounts is the stream now called Rio Carchi. Carchi means "limit" or "border," and forms the present international boundary between Colombia and Ecuador, and the ultimate origin of the peculiar location of the boundary between these two countries in the high mountain-parks rests on this obscure fact. The upper tributaries of the Rio Guaitara form with that stream a letter "T"; the stem part of the letter is the Guaitara, while the top is formed of the two streams which are to-day called the Carchi and Angasmayo. The important fact, however, which points to the identity of the Carchi with the Ancas-mayu of the history of the Incas is the statement of the old chroniclers that the Inca highway terminated on the north at the Ancas-mayu, and Cieza de Leon, who traversed this region in the first decade after the Spanish conquest, states that he found the terminus of this highway at the bridge of Rúmichaca, between Ipiales, in the present Colombia, and Huaca, in what is to-day Ecuador. The first building of Inca workmanship which he observed was a ruined fort at this bridge, and he

describes the Indian tribes north of the Carchi as without the Inca civilisation.

Sarmiento de Gamboa's account, which is based on the sworn statements of the descendants of the Incas living at Cuzco in 1572, says that Huanya Capac, the XIth Inca, "established his boundary pillars at the limit of the country he had conquered on the river called Ancas-mayu between Pasto and Quito, and that as a token of grandeur and as a memorial he placed certain golden staves on the pillars."

There is no doubt that the forces of the Incas invaded the country north of the Carchi several times, and according to the record of Sarmiento, in one of these raids which was made after the establishment of the boundary pillars on the Ancas-mayu, their forces "reached a dry region where there was little water," from which it is clear that these invading forces starting from the modern Carchi passed beyond the River Mayo into the dry plain of the Patía. From the Plain of the Patía they appear to have passed down the Patía to the sea, where it is said they secured rich spoils, emeralds, turquoises and mother-of-pearl.

According to Sarmiento's account, Atahualpa was defeated somewhat later, but before the death of his father, while on an incursion into the Pasto country. Had the Spanish conquest been delayed it is quite probable that the Incas would have consolidated their hold over the high region of the Tulcán-Túquerres park and the region of the modern Pasto, but at the time of the conquest the recognised boundary of the Inca Kingdom would appear to have been the Carchi or "limit," which name became a synonym for the old name of Ancas-mayu. It is the feeling that the Mayo north of La Union represents a natural northern limit

to this upland extending through Ecuador into southern Colombia, which the Incas did in fact to a large extent control, as well as the sound of the name which has led a number of Colombian writers to accept the Mayo as the equivalent of the Ancas-mayu of Inca History.

Even as it was, the Rio Carchi boundary line included certain tribes of northern Ecuador, such as those of Huaca and Tusa, which were considered by Cieza de Leon as belonging to the ethnologic group of the Pasto Indians. According to his account the Incas were much disgusted with the lack of cleanliness of the Pasto tribes, and he relates the story that when the Inca was fixing the tribute to be paid by one of the tribes and they protested they had nothing to give, he laughingly replied that their tribute should be a basketful of lice which he thought they might easily collect! Thereafter he sent them some "sheep" (llamas) in order that they might improve their condition and clothing, and furnish to him a part of the offspring of the animals as a tribute.

The Spaniards overran the country occupied by the Kingdom of the Incas without much opposition. However, when they passed north of the Carchi, they met a more determined resistance and the slaughter of the natives in the Pasto region and more particularly in the Plains of the Patía, Popayán and Cali, was correspondingly greater. In the plains the Indians were almost completely destroyed and the lands depopulated.

The River Mayo, which we crossed just north of La Union, forms at this point the boundary between the present departments of Nariño and Cauca, and the difference between the state of the road development was soon evident.

Ascending the slight rise from the river to the little group of buildings called Sombrerillos, we found ourselves on what was scarcely more than a sheep-path, and almost thought we had lost our way, but as we could see by the hoof-prints along the trail that our cargo-animals were still on the track we were following, we soon decided that the point at issue resolved itself simply into a difference in road development of the two Departments.

The present use of the name "Department of Cauca" is somewhat confusing. Originally derived from the restricted use of "The Valley of the Cauca" (the plain of Cali), it was used for all of western Colombia and was by no means an inappropriate name, as it then included this important part of the Cauca River Valley as well as the headwaters of the stream. Of this great Department Popayán was the capital, but in the new divisions of to-day the old Department of Cauca is split into ten parts, one of which bears the name "Departamento del Valle del Cauca," with Cali as its capital, and another, with Popayán as its capital, retains the old name. The present Department of Cauca is quite as much in the valley of the Patía as in the drainage of the Cauca, and it extends across the mountains to the east into the drainage of the Caquetá on the one hand and the drainage of the Upper Magdalena on the other.

From the little rise near Sombrerillos we got our first extensive view of the upper levels of the Plain of the Patía. The portion here visible has the aspect of a great alluvial-fan of gentle inclination originating in an opening in the mountains. Two Patía tributaries issue from this opening; one, the modern Mayo, with a large volume of water, flows to the southwest, and the other, turning northerly, finally

reaches the mouth of the Mayo after a roundabout journey of sixty miles, partly through the Patía. This flat fan must have originally extended, towards the southwest, to the east-west spur-range, 8,000 to 10,000 feet high, over which we passed between Berruecos and La Union, but this portion of the plain has been almost entirely destroyed by the erosion of the modern Mayo. It must likewise have extended across the valley to the Western Andes, but to-day it is here separated from that chain by the deep, rather narrow cut of the River Patía, which has trenched this plain-level to a depth of over 1,500 feet. The stream flowing northward from the gap, having less water, has cut a narrower trench, and the remnant of the alluvial fan stands to-day as the very extensive Mesa of Mercaderes, which is connected with the mountains only by the narrow neck at Sombrerillos.

Near the opening from the mountains the deposits are naturally coarse, masses of conglomerate show on the surface in much of the area around Sombrerillos, the soil is thin and of little value, but as we go from the mountains the deposits become finer and are more suggestive of deposits laid down in a body of water. This level portion has a mean elevation of about 3,500 feet, and is a great grazing-land covered with luxuriant grass. Occasional ridges of older deposits, for the most part metamorphic or igneous rock, stick through this valley-filling, but in the upper levels they are not of sufficient importance to affect the topographic aspect of this as a great flat plain, trenched by streams.

This level extends northward from Sombrerillos for about eighteen miles. It is then crossed by important

streams from the east and northeast, and here there is a broken plains-region with an elevation of about 1,800 feet. For about twenty miles the upper plain-level is entirely absent in the central part of the valley, though it probably will be found on the flanks of the mountains on either side. To the north of this depressed area of the crossing of the stream we climb at Bordo to a rolling plain, sometimes called "the Llanos of the Patía," which has the same mean elevation as the Mesa of Mercaderes, and extends northward for sixteen miles until interrupted by the Alto de San Francisco and succeeding hills representing the southern edges of the Plain of Popayán.

Passing through Sombrerillos and out over the plain, we arrived about nightfall at the village of Mercaderes, which has a population of a few hundred. However, we pushed on, and as the night was clear, camped in the open without tents. The following morning, the 17th of July, we continued along the upper level of the Plain for some miles and then descended by a series of terraces into the low-levels along the Patía. Here we were only 1,800 feet above sea-level, and it was so dry and hot that we found a plunge in the relatively cool waters of the Dios Rios, which we reached in the afternoon, very refreshing.

Two rivers of considerable size, each with a multitude of tributaries, originate in the mountains to the east of the Plain of the Patía. These are the Rio San Jorge and the Rio Guachicono, the one coming from the southwest and the other from the northeast. They unite in the centre of the Plain of the Patía and their waters form a single stream called the "Dos Rios" (Two Rivers), which after a course of about four miles joins the Rio Patía. The crossing place

of the Dos Rios (1,755 feet) is just below the juncture of the San Jorge and Guachicono, and as the stage of the water prevented fording, we with our saddles and all equipment were conveyed across the river in a great canoe made by hollowing out the trunk of an enormous tree. The canoe made several trips, and altogether an hour and a half was consumed in the crossing. The animals on account of the swiftness of the current and the depth of the water had some difficulty, but after a little encouragement all reached the northern bank. We camped for the night near a few negro huts, called Manguita, on a bluff overlooking the Rio Guachicono—a picturesque though virtually deserted spot.

Cieza de Leon records that on the route between Popayán and Pasto there was a village which was “great and very populous in ancient times as well as when the Spaniards discovered it, and where the Indians lived in deep and lofty ravines.” He says that the Spaniards called the place where this village was “El Pueblo de la Sal”—the Village of the Salt—and he described it as at a point where the valley of the Patía becomes very narrow and on the western side. This suggests the narrows where the Patía passes through the Western Andes, but the only two important salines between Popayán and Pasto of which we have been able to learn are: (1) along the San Jorge and its tributaries near the edge of the mountains which border the Plain of the Patía on the east, and (2) along the Mayo south of Mercaderes. In both of these places there are “deep and lofty ravines,” and since the Spanish conquest they have produced a great many tons of salt. The salines of the San Jorge are the more important, and we are inclined to regard this as the site of “the great and populous city” of El Pueblo



The plain of the Patía, with the Central Andes in the background.
This is the Mesa de Mercaderes, the upper level of this plain



The plain of Cali at its southern end, where it meets the northern
dissected edge of the plain of Popayán

PLAINS OF THE PATÍA AND CALI

de la Sal. We could see the rugged mountain slopes near this locality from our camp at Manguita.

We continued our way northward on the 18th along the old and unimproved trail between the Rivers Patía and Guachicono. The settlement of Patía, 1,850 feet above sea-level, is a small collection of miserable structures with a population of less than 100 people. It is a locality which offers such irrigation possibilities that we expect this almost deserted section to become in time a thriving and populous centre. Beginning about two miles north of the present village of Patía and extending south for ten or twelve miles along the way we have come, there is a belt of land averaging about half a mile in width which lies between two very low ranges of hills. The range to the east is relatively continuous, while that to the west is broken by valleys through which the drainage from this strip passes to the Patía River some miles distant at the foot of the western mountains. The soil seems deep and fertile and the slope of the land is such that if an irrigation ditch were carried along the foot of the hills to the east the water could be easily handled and there would be no danger of accumulation of alkalis. The water for such a project would come from the Guachicono River, which even at this, the dry season of the year, contains more than ample water for a project of this size. The canal would be led from the river along the hill-slopes which border it on this side, and would enter the part just described through a gap or short tunnel in the hills near the head of the little stream which flows past the village of Patía.

We tried bathing in a little pool in this small stream near the settlement of Patía, but the water was abominably warm

and rather stagnant. Seven miles beyond we climbed up a steep hill to the town of Bordo, which is slightly over 3,000 feet above the sea and on the edge of the northern portion of the upper level of the Plain of the Patía. It is a prosperous looking place of a few hundred inhabitants, with several little shops and a part white, part negro, population. It is not even mentioned in the 1912 census of the Republic, and is doubtless included in the figures for the Municipio of Patía, 4,127, which probably includes all the population from the crest of the Western Andes to the foot of the Central Andes, and from the Dos Rios to the region of the Alto de San Francisco, over thirty miles north. A glance at the census might suggest that the village of Patía is an important place of several thousand inhabitants, instead of being an unimportant hamlet in the Municipio of that name which contains other settlements of more consequence.

From Bordo we continued north over a rolling plain. At the collection of houses known as Aguasblancas, 3,247 feet above sea-level, according to the railway survey, we sought to buy some chickens and eggs, and were informed that they would not sell them unless we camped at that place for the night, which illustrates a feeling only too prevalent amongst certain classes throughout South America who feel that all products should be utilised at the point of production and not exported. Many a mining industry when it has reached the stage of exportation has experienced a local hostility to the shipping away of the ore. As it was only mid-afternoon and our cargo animals were well ahead, we were disinclined to stop and so plodded on until at sunset we reached a delightful grove on a level bit of land, with a

turbulent mountain stream, the Rio Guachicono, on one side, and the Guavita, a little tributary, on the other.

It was such a charming place that we decided to spend Saturday, the 19th, here in the hope that Mr. Ronald Parker would arrive and that we could hold our conference in this ideal spot. He left Bogotá some time ago on the overland route to Quito, in order to take up his appointment there as a representative of S. Pearson & Son, Limited. He was directed to proceed overland en route, and was instructed to take the shortest way, which is up the Magdalena Valley to Neiva and then over the Central Andes to Popayán. He was reported to us by telegraph to have left Neiva on the 7th, and had he not had unforeseen difficulties he would have reached Popayán in time to join us at this spot.

After a delightful day in the little grove on the banks of the Guachicono, we resumed our journey northward on the 20th of July. The river had undermined a portion of the trail, but after an exciting few moments on the sliding earth we reached the plain-level and soon passed two ordinary-looking houses, which bear the pretentious name of San Francisco. This settlement, 3,800 feet, lies at the southern edge of the Alto San Francisco, which, rising 1,500 feet above it, represents the southern, much-eroded edge of the Plain of Popayán. The hill is of an oblong, conical shape, with valleys on each side, in either of which a road could be easily constructed that would avoid the steep ascent of the hill and its descent to the north, but following the habit of the older trails of the country, which for the most part follow the crest of the ridges without any attempt at scientific location, our trail zigzagged up to the top, and then after a short time tumbled down into the de-

pression to the north. Here there are a few houses at an elevation of about 4,800 feet, called "Los Arboles."

We stopped some hours before nightfall on the banks of the Rio Esmito, which showed a number of attractive bathing pools, and setting up our folding beds in a little clump of bushes by the side of the trail, spent the night here. Someone said "snakes," so the cot of one of the party, with its great white mosquito-net canopy, was moved to the open ground on the very edge of the trail, where it proved so strange a sight that a train of cargo mules which came along about midnight became frightened and stampeded with a terrible din. However, they were soon rounded up and regrets expressed to their owners, who proceeded on their way quite pleased with the little present made to them.

Beyond the Rio Esmito is the little village of Dolores which we passed early the next morning. It contains 40 to 50 houses and represents a population of perhaps 300, while the Municipio of the same name contains 5,659 persons according to the census of 1912. Beyond this town we crossed the "Cuchilla de Dolores," a little ridge between two stream-valleys, cut into the Plain of Popayán by tributaries of the Patía. Towards noon we reached Timbío, twelve miles from Popayán, and here, at the very southern edge of the village, we met Mr. Parker. The Alcalde of the town being appealed to, we secured the only two-storied house in the place, just completed but not yet occupied. The second floor was one large room, reached by a stairway on the outside of the building, and here we enjoyed the luxuries which Mr. Parker had brought from thoughtful friends at Bogotá, including the British Minister, the French Minister and the American Chargé d'Affaires.

Mr. Parker crossed the Central Andes between Neiva and Popayán by a pass 11,550 feet high. He described the summit as a broad paramo, deserted and bleak, where his mules suffered greatly from lack of food, and he found them so exhausted when he reached Popayán that he was forced to rest for several days. It was a much thinner Parker than the one we had bid adieu to at Bogotá some months ago. We propose to cross the Central Andes by the Quindío pass, between Cartago and Ibagué, which is only 200 feet lower, and it is suggested that we will have a hard time of it.

After luncheon on the following day, the 22nd of July, we proceeded toward Popayán, a foretaste of which we had already had in the delightfully picturesque old Spanish masonry bridges across even the small streams. These are commonly of a single arch and the roadway rises sharply from the banks on either side to the centre of the bridge. These old bridges are wonderfully well made, so much so that they have defied time and neglect, and they stand to-day as striking monuments of old efficiency, often amid present-day neglect. Throughout the Department of Cauca, as well as many other parts of the Republic, the progress made before the War of the Independence compares only too favourably with what has been accomplished since. These bridges, we are told, are found for many miles along the old roads leading from Popayán in all directions.

Timbío is in the drainage basin of the Patía River, at an elevation of 5,900 feet, while Popayán is on a tributary of the Cauca, a few miles to the north at an elevation of 5,600 feet, and as we rode along we were naturally on the alert to determine exactly when we crossed the interoceanic

divide, but were unable to do so. The slight rise north of Timbío is very flat-topped, and from anything we could see from the trail the Rio Timbío could quite as well have joined the Cauca as the Patía. The intervening elevation is much less striking than the "Cuchilla de Dolores," which lies between two tributaries of the Patía.

After a time we saw in a slight depression in the plain the white walls and red roofs and church towers of Popayán, and not till then did we know that we had crossed the divide. Lord Murray was met some miles from the city by a great cavalcade of the important people of the district, among whom were Dr. Tomás C. de Mosquera, grandson and namesake of the noted President and patriot, Dr. Guillermo Valencia, scion of an ancient family and one of the poets and writers of Colombia, Dr. Ulpiano Riascos, a brother-in-law of the Minister of Foreign Affairs in the present Government, and many others. We entered the city by the new cart road from the south over an old Spanish bridge of many arches, and were conducted to the charming house, on the Calle de la Ermita, which had been placed at our disposal.

Popayán is situated on the banks of a little tributary of the Cauca, the Rio Molino, near the eastern side of a gently rolling grass-covered plain, which stretches away to the west for twenty miles until interrupted by the dark wall of the Western Andes, some of whose peaks rise 4,000 to 5,000 feet above the plain. Only two or three miles to the north is the Rio Cauca itself, here a rather turbulent stream whose waters foam among the great boulders swept down from the mountains, while immediately to the east are the spurs of the Central Andes, that rise steeply to the regions of the eternal snow. From the environs of the city there is visible



Bridge at the lower end of the gorge of the Mayo, near
La Union, Colombia



A typical example of the old bridges found for many miles around
Popayán, the excellent construction of which is in marked contrast to
the present condition of the connecting trails

OLD SPANISH BRIDGES

to the southeast the perfect cone of the extinct Volcano of Sotará, 14,500 feet, whose top is generally covered with snow. To the east is the high ridge of the Sierra Nevada de los Coconucos, over 13,000 feet high, with its four snow-capped peaks, Palaterá, 15,300 feet, the two Coconucos, 14,900 and 14,800, and the still smoking volcano of Puracé, 15,400 feet, while forty-five miles away to the northeast is the giant Huila, 18,250 feet, a dead volcano and one of the three mountains which, according to different authorities, is the highest in the country. Its cone towers over 6,000 feet above the ordinary crest-line of the Central Andes, and its upper 3,000 feet is always covered with ice and snow.

The last great eruption of Puracé was in 1849, when it is said to have blown off over 500 feet of its summit. A lesser eruption on the 31st of August, 1878, scattered fine ashes over the city and surrounding country, but, notwithstanding the activity of the natural forces—for the city, according to Perez, suffered a hundred and twenty earthquake tremors in the century preceding 1862—Popayán is a city of peace and quiet. It is singularly appropriate that it should number among its sons the scholar and scientist, Caldas, and that he should have conducted his experiments relative to the determination of altitudes by the variation in the temperature of the boiling point of water in the nearby Paispamba, the hacienda of his family. It is also equally fitting that the city should centre around the Plaza de Caldas, and that there should here be a statue of this celebrated Colombian.

In the principal Plaza at Pasto is the statue of Nariño, the warrior, and overlooking it from the façade of the cathedral there is still the crown and royal arms of Spain;

in Cali there is the Plaza of Independence, containing the park of Caicedo, recalling the first President of the first "Junta Republican" organised in that city and one of the first martyrs of the War of the Independence, but in Popayán is the Plaza and statue of the eminent student and investigator, Francisco José de Caldas!

When the Spaniards first invaded the country they found on the site of the present town the capital city of an important and warlike Indian tribe, who offered a very serious resistance to the march of the invaders. Tradition says that the palace of the Indian chief was on one of the two rectangular hills which occur on the southern border of the present town. The name of this Indian tribe was Pubén, according to the Popayán scholar, Antonio Cárdenas, and it was owing to an incorrect pronunciation of this word by the southern Indians who accompanied the Conquistadores that it was recorded as Papyán, whence the name Popayán.

According to the last census, the population of the Municipio of Popayán, which covers a very large area, is 18,724, but only a part of this number is found within the city itself. It suffered severely in the earthquake of 1827, and many of the buildings still show the cracks produced by the earthquake of the 31st of January, 1906. The most notable buildings are the churches and the cloistered convents and monasteries built by the various religious orders. The latter have almost entirely been taken over for administrative and educational purposes, which is true of such buildings at Bogotá and generally throughout the Republic. The old monastery of San Francisco is now occupied by the Governor and civil administration of the Department, the old monastery of the Dominicans by the University of

Cauca, the old convent of La Incarnación by the College for Young Women, the old convent of San Camilio by the "Mayor Seminario," while the old convent of El Carmen and the monastery of San Agustín are occupied by primary schools.

Popayán is characteristically an old city, and although it suffered severely in the earthquake of 1827, it probably did not differ greatly a hundred years ago from what it is to-day. Here we saw again lingering representatives of the silver basins and ewers and goblets and plates—which were fairly common in the old Spanish days. A few are still to be found at other old cities like Quito, Pasto and Bogotá, but most of them have long since gone into the melting pot. Popayán is the centre of a region with great agricultural and grazing possibilities, but is so isolated in the sense of modern means of communication that there is no prospect of its changing its character until the completion of a railway through the country, when the natural richness of the tributary region, now only partially developed, its temperate and healthy climate, the beauty of its surroundings and its abundant mountain water supply will undoubtedly make it a very prosperous and important city.

There is one four-wheeled vehicle in Popayán, the great state coach belonging to Dr. Valencia, which has been brought to this place at what must have been a very considerable expenditure of energy. Dr. Valencia was most kind to Lord Murray and the members of his party; he had planned many excursions in the neighbourhood, including a stay at his country place, and it is one of the regrets of our journey that we were unable to accept his overflowing hospitality. When he learned that Lord Murray felt that

he must continue his journey with only a short stay in Popayán, Dr. Valencia had insisted that it was only fitting that he should drive Lord Murray on the first stage of his journey in his carriage. Accordingly, at noon on the 24th of July, the time fixed for the departure, the great coach stopped before the door of our house with a liveried coachman holding the reins of its two horses, who looked as if they did not particularly relish their unaccustomed task and would have infinitely preferred saddles. When we were all seated, the great coach moved off, with its attending cavalcade of horsemen, slowly over the rough cobble-stones and, amid the excitement of the populace, passed along the Plaza de Caldas, out the Calle del Humilladero and over the picturesque, many-arched bridge spanning the Rio Molino, to the new cart-road which leads northward from the city.

The slow and steady progress of the carriage gave us a very delightful hour's chat with Dr. Valencia, who is an accomplished linguist, and we learned with much interest that he had a very wide and intimate knowledge of the English writers, and that his favourite authors were Scott and Kipling, complete sets of whose works he had in his library.

The cart-road ends abruptly a short distance beyond another delightful many-arched bridge across the Cauca River, built in the XVIIIth century, and as the coach could proceed no further, we all mounted our saddle animals, and Doctors Valencia and de Mosquera rode with us some distance. They expressed the hope that we would get a good view of the snow-capped mountains, but the clouds hung low and only for a few minutes did we get a glimpse of the white top of Puracé.

The road lies across a rolling plains-country, on the whole gradually ascending to a point between the Palacé and Piendamó rivers which, according to the railway survey, is 100 feet higher than the divide between the waters of the Patía and Cauca, which we passed between Timbío and Popayán. At nightfall we reached the little settlement of Piendamó, where a family very kindly let us have the two rooms of their house, while they spent the night in some outbuilding. They were extremely interested in our folding beds and in the various tinned provisions, but thought that if they prepared us some coffee and eggs and local bread we would fare much better, with which we heartily agreed.

After the meal we all lighted our pipes and the grandmother of the household, after much hesitation, asked if she might not be permitted to inspect one of them. She had been told by the priest, she said, that in foreign countries the people smoked a very wicked drug called opium, but she had never before seen anyone who smoked it, or examined one of the pipes used for this purpose! Nearly everyone in Colombia smokes tobacco in the form of cigarettes, and the grandmother was herself smoking one at this time, but the pipe is never seen except in some of the larger places where it has been introduced by students returning from the United States or Europe. It is perhaps a mark of British conservatism that they should cling to the method which, borrowed from the Indians of North America, was the manner in which tobacco was first consumed in Europe.

Our progress from Popayán to Piendamó, twenty-four miles in the afternoon, is a very good indication of the relatively level plains character of the country, as it was more than we had made in some full days on the more rugged

trails. The following day we easily made the forty-two miles to Buenos Aires, which is on the very northern edge of the Plain of Popayán. North of Piendamó this plain is virtually unbroken along this route for twenty-five miles, when it is cut by the Ovejas, an important tributary of the Cauca which has trenched the plain to a depth of 1,500 feet, and the descent into the Ovejas valley, like the ascent beyond, is very steep. The Cauca, which was virtually at the level of the plain when we crossed it near Popayán, is here in a steep-sided trench over 1,500 feet deep. The last fifteen miles of the way to Buenos Aires is rather broken, as it passes through the northern, dissected portion of the plain, and from this town, 3,800 feet, there is visible, just to the north, the great level Plain of Cali, here having an elevation of 3,500 feet. The most notable feature of the day's trip was the appearance of a remnant of a low cross-range just south of Buenos Aires, suggesting a former break across this depression between the Western and Central Andes and the possible dividing line in former times between the ancestral Patía and Cauca drainage systems.

Between Piendamó and Buenos Aires is Morales, 5,450 feet above sea-level and with several hundred inhabitants. It is the principal place in the extensive Municipio of this name, which has a population of 3,167. We reached here late in the forenoon and our train of pack animals with their peculiarly shaped loads was at once surrounded by an excited crowd, which melted quickly when they discovered we were not a travelling cinematographic troupe planning to entertain the town.

The strongest impression one carries away from a journey through these plains is that the small number of people re-



The Plain of Popayán at Timbío in the drainage of the Rio Patía



The plain of Popayán at Morales in the drainage of the Rio Cauca

PLAIN OF POPAYÁN

siding in them is quite out of proportion to the character of the land and climate. One cannot help recalling the words of Cieza de Leon, written in the first decade after the Spanish conquest relative to this very section of country between the Ovejas and the Piendamó, over which we have just passed: "The whole of the plain was once well-peopled, but those whom the fury of the war have spared have retired from the road." These plains, including the famous Plain of Cali, are certainly supporting but a small fraction of the population they are capable of sustaining. The recent census report shows that, including the population of the cities and towns, there are but ten persons per square mile in the Plain of the Patía, but sixty in the Plain of Popayán, and but a hundred in the Plain of Cali.

Arriving at Buenos Aires in the evening of the 25th of July, we sought for the house of Mr. Robert Lehman, to whom we carried a letter from Dr. Tomás de Mosquera. He was absent, but we were most cordially received by his clerk, who did everything possible for the comfort of our party. As we were paying the following morning for a number of articles purchased from the store, we saw scattered over the blotter and caught in the crevices of the desk a number of yellow grains, and suggesting that it looked like gold dust, we were informed that they purchased quite a little alluvial gold which negroes brought to them. While we were there two old negro women brought little bottles partially filled with gold dust, which they exchanged for articles from the shop.

Our departure from Buenos Aires the next morning was delayed for some hours owing to difficulty in finding the village blacksmith to reset the shoes of some of our animals,

but getting away about noon, we soon reached the Cauca River, here quite a stream, navigable for small steamboats for several months of the year, and crossed it in a small ferry-boat. This is the "Paso la Balsa," 3,542 feet above sea-level by the railway survey, and is the point where the Indians crossed the river in balsas and canoes even before the arrival of the Spaniards. Here the Cauca River leaves the great trench it has cut into the Plain of Popayán and enters the Plain of Cali. Toward the east there is a lobe of the Plain of Cali, which extends some ten or fifteen miles further south. In this southeastern extension is the important town of Caloto, where much alluvial gold has been obtained. This place is reported to be a hundred feet lower than the Cauca River at the Paso la Balsa, from which we infer that the river is located on a broad alluvial fan. Even so the lands immediately along the Cauca in the southern portion of the plain are liable to overflow and are rather prone to be marshy.

A rather low, eroded remnant of the Plain of Popayán extends along the west side of the river for some miles below the crossing, and ascending this, we passed through the little settlement of Cañitas, 4,100 feet, and down into the bamboo-filled valley of the Rio Clara where, charmed with the clearness of the stream and the beauty of the great clumps of overhanging bamboos, we stopped for a plunge in its waters. Here Lord Murray missed a very valuable signet-ring, which had long been in the possession of his family, and which he remembered to have taken off when we were bathing in the muddy waters of the Cauca at the Paso la Balsa. We accordingly decided to stop amid the bamboos on the Rio Clara for the night, while José

returned to the crossing place to see if he could find the ring.

We were told later that the place where we stopped was a snake infested hole, and we were also informed that because of the snakes no one ever stopped along these roads except at a house. However, we saw no snakes, and I may add that in travels of many months through both the lowlands and uplands of northern South America, in this as well as other years, often in regions far from any settlements, I have never seen as many snakes as in certain thickly settled portions of the Mississippi valley. Snakes there are, of course, in northern South America, some very large ones, but they are only occasionally encountered and do not swarm everywhere in the manner that vivid imaginations have so often painted.*

José returned at daylight the next morning with the ring which had been found by the people living there, who at once surrendered it to him when he asked for it. The Colombians are inclined to be rather sharp traders and

*Others have likewise commented on the few snakes which one encounters in northern South America. In 1906 and 1907 Prof. Hiram Bingham journeyed overland from Caracas to Bogotá, along the route followed by Bolívar in 1819, for much of the way over little travelled roads and through thinly settled regions, and his comment on a little coral snake seen along the road between Bogotá and Honda is: "It seems incredible that this is only the second live snake I have seen in four months and a half. Judging by my own experience, New England appears to have far more than Venezuela and Colombia!" Scruggs says of an experience extending over twenty-seven years: "The popular opinion is that these forests and jungles, and indeed those of tropical America generally, are full of poisonous snakes and reptiles; but although I have passed up and down the Magdalena more times than I can remember, and have spent whole weeks at a time in the wilds of the Andes, I never saw but one or two insignificant-looking snakes, and these were not of a venomous species."

dearly love to bargain, a characteristic which they share with a great many others we might mention, but their inherent honesty in the matter of ordinary theft is very great. Mr. Frank Tracy, an Englishman, who has a large business in Medellín, where his firm are the shipping agents for a number of gold mines in that region, told us that the gold ingots were delivered to him by Indian carriers who packed from 50 to 100 pounds on their backs. Unarmed and unattended, they carry this wealth for several days along routes, which they follow at stated intervals known to everyone in the country, but he did not know of a single instance of robbery. This is a very marked contrast with the conditions which have prevailed in some of the gold-mining districts in the United States and Australia, where bandits were considered a matter of course, and where gold was not moved without an armed escort, which on more than one occasion was attacked and robbed, generally with the loss of life.

Immediately beyond the Rio Clara the trail enters the Plain of Cali, and at several places our animals experienced no little difficulty because of the boggy ground. Passing Jamundí, which is in the level plain at an elevation of 3,447 feet, we continued northward until, finally ascending an almost imperceptible rise, we reached Cali about noon. Here we found a suite of rooms had been prepared for us at the "Gran Club," and never before had we had such a constant flow of callers. The leader of the Liberal Party, General Rafael Uribe Uribe,* one of the many able and versatile men Colombia has produced, had telegraphed to

* Most unhappily and unfortunately assassinated on the steps of the Capitol in Bogotá, within the past year.

his friends in Cali, as had likewise the Minister of Foreign Affairs, Dr. Francisco Urrutia, Dr. Nemesio Camacho and many other friends at Bogotá, as well as our good friends in Popayán, Dr. Valencia and Dr. Mosquera.

The Municipal Council called on Lord Murray in the afternoon to discuss the projected water-supply, canalisation and paving of the town, and the interest shown by this commercial community in the surveys which our firm is about to undertake at Buenaventura for the Colombian Government, decided Lord Murray to make a flying visit to that port. We accordingly plan to leave here for Buenaventura to-morrow, the 29th of July.

FIVE

CALI AND BUENAVENTURA

*On Board the "Vapor Cabal,"
Rio Cauca,
Departamento del Valle del Cauca,*

5th August, 1913.

CALI is three miles from the Cauca River, and its situation with respect to the master stream of the region is thus analogous to that of the other towns of the Plain of Cali, not one of which is on the banks of the Cauca. All are near the clear waters of tributary mountain streams and generally on the slightly elevated ground afforded by the alluvial-fans built into the plain by these streams. The stream at Cali is called on most maps the Rio Cali, but is more generally referred to by the inhabitants of the town as the "Rio Grande." It rises in the Cordillera del Chocó, or Western Andes, some fifteen or twenty miles southwest of the town, at an elevation of about 9,000 feet or 5,400 feet above the city, and the narrow valley through which it flows is separated from the great Plain of Cali by a gradually lowering mountain-spur, at the northern end of which is the city, partly on the last low hills, but to a greater degree on the slightly dissected alluvial-fan. A settlement was established here primarily because of the great expanse of fertile land with good climatic conditions, and secondarily because this stream gave an excellent supply of clear mountain water and its alluvial-fan furnished a slight elevation above the general plain level. It is historically only a chance happening that Cali found herself commanding

the easiest route across the Western Andes to the harbour of Buenaventura, the existence of which was not even known to the Spaniards at the time of the foundation of Cali.

We were much impressed with the commercial activity of the town of to-day, whose importance will be increased by the completion of the railway from Buenaventura and the construction of suitable harbour facilities at that port. It has the usual Spanish-American type of architecture, and appears a town of about 15,000 to 20,000 inhabitants. Like Popayán, though to a lesser degree, it has suffered from earthquakes, the most serious of which occurred in 1765, others of lesser importance occurring in 1885 and 1906. Much English and French is spoken, and many of its business men have been educated in the United States. The town possesses electric light derived from a hydro-electric plant on the "Rio Grande," and a tramway connecting it with the Cauca River. In the city there is an old stone bridge across the "Rio Grande," and we were not surprised to learn that it had been constructed during the time of the Vice-Royalty. There is, also, a modern bridge, the Puente de Santa Rosa, a mile or two up the stream.

We crossed the old Spanish bridge on the morning of Tuesday, the 29th of July, and turning to the left on our way to Buenaventura continued for some miles up the river. Along the banks there were many people washing clothes by the usual Colombian method of pounding them on stones, and notwithstanding it was early in the forenoon, there were many bathing in its waters. The inhabitants of the Plain of Cali are very fond of the water and their delight in open air bathing is one of their dominant characteristics.



MULE TRAIN IN DAGUA GORGE

During our little stay in Cali we saw this stream on several occasions at different points above the city, and always found it filled with people of all classes.

In many of the larger haciendas there are well-constructed stone pools fed by little rivulets diverted from the mountain streams, and in "María," that masterful picture of the life of the "Cauca Valley," by Jorge Isaacs, there is this description of such a pool: "Somewhat later it was told me that my bath was ready, and I went to enjoy it. A thick and leafy orange tree, loaded with ripe fruit, formed a pavilion above the broad tank of polished stone, roses were floating on its water; it was an oriental bath, perfumed with the flowers which María had gathered in the morning."

After a time the trail leaves the bank of the river and begins to climb the mountains along a spur between the "Rio Grande" and another small mountain valley which opens into the plain just to the north of Cali. The gradient is easy and the construction of a cart-road along this part of the route would be a relatively simple matter. This spur of the mountains, as well as the whole of the western slope of the range which is visible from it, is free of trees but covered with grass, emphasising the temperate character of the rainfall in this basin between the Western and Central Andes.

Just on the eastern side of the crest of the range we passed through San Antonio, the health resort of Cali, which consists of a collection of summer cottages occupied by the families of the merchants of the city during the two dry seasons of the year and now filled with people. San Antonio is only four miles from Cali in a straight line, though the distance by the trail is much greater, and as it

is 3,000 feet above the city, is much cooler. Its neighbouring eminences command magnificent views of the plain, with the contorted thread of the Cauca running through it, and of the Central Andes beyond, with its several snow-capped peaks,—the giant Huila and the lesser Barragán or Santa Catalina (15,560 feet) are often visible, and occasionally there is a glimpse of Puracé and its associates far to the south and of Tolima and its sister peaks far to the north.

Immediately beyond San Antonio we crossed the crest of the mountains through a pass whose elevation is only 6,620 feet, and plunged at once into a dense moisture-dripping tropical forest. These western slopes of the range catch the winds from the ocean and forcing them to ascend, wring from them part of their moisture, and it is for this reason that there is a low rainfall and lack of tropical forest on the eastern slope of the range up which we have just come. The descent is steep and we soon pass out of this forest belt into a north-south valley, which in the character of its vegetation is but a miniature of the great plain region we have recently left—the Western Andes is here locally composed of two parallel chains, the western one not quite so high as the eastern. The valley between is thus in exactly the same position as the main plain with respect to the winds from the Pacific; the range to the west catches the rains and the winds float over the intervening valley till they strike the higher range to the east, where they again yield their moisture and produce the forest belt through which we have just passed.

Singularly enough, it was this miniature of the Patía-Popayán-Cali valley, and not, as generally stated, the valley

in which the present "Rio Grande" flows, which supplied the name that is now spelled Cali. Cieza de Leon says, "The valley of Lile is five leagues from the city to the west; it is a small valley closed in by mountains, where there are very many villages of Indians who are docile, a simple people void of malice, who live in large houses, and through the centre of the valley a river flows." The valley, according to his account, was filled with fields of maize and yucca, and there were many fruit trees.

The stream in this valley to-day, called the Dagua, after flowing to the north, turns abruptly to the west and passes through the western chain in a great gorge known as the Boquerón. This valley is now rather sparsely populated; there is first the little group of buildings called Campoalegre—"joyful country"—and then El Carmen, twenty-five kilometres, or five leagues from Cali, and 4,900 feet above the sea. This is a place of 100 or 200 people, with several shops and a church, and here we stopped for luncheon at a little house bearing a pretentious sign which informed travellers that it was the "Hotel del Valle del Cauca." Lord Murray was delighted to find the lady of the house using a Singer sewing machine which, by the mark, he recognised as having been made at the Singer factory on the Clyde, and not in the United States. We then continued nine miles to the new railway town of Caldas, which is on the western bank of the Dagua and in the same comparatively treeless valley. Here, by the instructions of the President of the Board of the Railway Company, we were most hospitably received and entertained at the house of the Superintendent of the line, Dr. Juan de la R. Barrios.

The following morning (July 30th) we were conveyed

in a special train, with our saddle animals, a distance of 14 kilometres to Espinal, which consists of a few houses situated just above where the Dagua turns to the west and passes through the mountains. The railway track through this gorge was destroyed by the great freshet of October last, when the Dagua rose 15 feet, or 5 feet above any previous flood stage. The railway had been constructed only a little above the old high-water mark and the swollen waters carried down a great mass of timber from the construction work above, which, lodging against the bridges, formed temporary blockades under the pressure of which all the bridges in the gorge, as well as several below it, were carried away, together with much of the connecting track. The great force of the freshet is indicated by the fact that one of the bridges weighing ninety tons was carried bodily about half a mile down the stream, where it is still to be seen partially buried in the river gravels.

This portion of the railway is now being rebuilt, but it will be some months before trains will be able to again traverse it. We accordingly mounted our animals at Espinal, which is about 2,500 feet above sea-level, and riding a little way through cacti and other vegetation of arid lands, soon climbed to the excellent and well-travelled mule-road along which for the last fifty years most of the exports and imports of Western Colombia have passed. The portion of trail through the gorge is on the south bank of the river and is blasted out of the rock face of the mountain, high above the foaming waters. The mountains here are covered with a dense forest growth, for we are now out of the rain-shadow and in the belt of heavy precipitation, which extends to the Pacific Coast. The main

gorge is some 8 miles long, and we very much enjoyed our ride through it. From a scenic standpoint, we were glad that we were on our faithful animals, and not on a hurrying railway train.

The line which is being reconstructed through the gorge is still perilously close to the water level. Its location differs only in minor particulars from the old grade which was wrecked by the flood, and it seems to us that a recurrence of this disaster is invited, for even the height of the last flood cannot be taken as indicating the highest point to which flood waters will rise in a narrow gorge of this description. A higher location would, however, increase both the cost and the date of completion to Cali, and the outlay in time and money on this line has already been very great.

The gorge as a marked topographic feature ends where the Rio Pepita joins the Dagua. Here is the old settlement of Juntas and across the river the new railway town of Cisneros, named in honour of Señor Francisco Xavier Cisneros, a Cuban engineer, who is still the outstanding figure in the history of Colombian railway enterprise and to whom the inception of this line, as well as the lines to Medellín and Bogotá, is due. Juntas (1,100 feet) was formerly a place of considerable commercial importance, as it marked the upper limit on the Dagua which was navigable in canoes. Before 1878 all imports were carried from Buenaventura by water to this point, where they were loaded on mules for conveyance to the interior. This strip is most graphically described in the later pages of "María." The first trails were very steep and led over the mountains, and it was only after a time that the present well-graded way was

blasted out of the sides of the Dagua Gorge. Occasionally, when the water was very low, the more venturesome are reported to have followed the bed of the stream itself, but this was very dangerous and seldom resorted to.

Below Cisneros there are still elevations of some little height on both sides of the river, and the trail, here on the north bank, has in many places been blasted out of the rock. Travel along this portion, as well as through the gorge, is rather slow since the trail is filled with trains of mules carrying goods, and in some places it is not safe to pass owing to the narrowness of the track and the precipitous nature of the descent to the river below. To warn others of their approach the mule-train drivers carry cow-horns fashioned like the old-time horns used on the Scottish borders, which they sound constantly. On hearing the horn one must perforce seek a wide part of the trail and wait until the whole cargo-train has passed by.

Four miles below Cisneros we stopped at the division headquarters of the railway engineers, where luncheon had been prepared for us. After two hours' ride we forded the Dagua to the railway station called "Valor." Here our animals were sent back to feed in the railway company's pastures while we continued in a special train to Buena-ventura. This was the first passenger train to go over the new track between Valor and San José since the destructive flood of October, 1912. At San José, which is on the north bank of the river, the station and all of the surrounding ground was piled high with goods and the earth had been cut into a veritable sea of mud by the hoofs of the mules delivering the exports of the region to this temporary railway terminus and then loading goods for the interior.

The whole region below Cisneros, with its river and luxuriant tropical vegetation, is very picturesque and of an entirely different character from the mountains through which we travelled from Quito to the beginning of the Dagua gorge. We are now only a few hundred feet above sea-level and find the heat and humidity exhausting after our many weeks in the mountains. The very wet character of this coastal region is indicated by the rainfall at Buenaventura, which, we were told, is between 350 and 400 inches per year. The distribution of the rainfall on the western coast of South America presents several interesting features. All that portion of Colombia which lies between the crest of the Western Andes and the sea, except occasional little valleys like that of the upper Dagua, which are in the rain-shadows of local irregularities of the range, is deluged with rain. The present population of this section of Colombia, according to the 1912 census, is five persons per square mile, including the Indians and the inhabitants of the towns. It does not offer many attractions for agricultural development, and it is not a region in which we ever expect to see a dense population; whatever increase it enjoys will be largely due to mining developments.

In northern Ecuador the same conditions of rainfall prevail between the coast and the western crest of the mountains; but to the south of the Gallapagos Islands the rainfall grows rapidly less; toward Santa Elena desert conditions prevail, while further to the south are the great deserts of the coastal region of Peru and northern Chile. The lack of rainfall on the southern portion of the Pacific Coast of South America appears to be due to the precipitation of the moisture from the western winds into the ocean before

they reach the land, owing to the chilling effect of the cold ocean current which, originating in the Antarctic, flows north along the coast of Chili until, deflected to the west by the sharp northwest turn of the coast-line along Peru, it passes out to sea immediately to the south of the Gallapagos Islands.

Below San José we cross the Dagua twice and, entering on the old line constructed by Cisneros, pass the settlement of Cordoba, which is about eleven miles from Buenaventura. The railway here leaves the river and climbs a low ridge, the highest point of which is only a little over 300 feet above sea-level, and follows it to the swamps near Buenaventura and then over the bridge to the little hilly island on which the town is situated. This portion of the line, through a country offering no engineering difficulties of importance, has gradients of 4 to 5 per cent and very sharp curves. The track has very carefully followed the crooked crest-line of the ridge apparently for the reason that such a location gives the greatest mileage and the lowest initial cost per unit constructed. The construction of a good line with low gradients and gentle curves would apparently be a relatively simple matter.

Reaching Buenaventura about sunset, we were met by a representative of Mr. D. C. Stapleton and conducted to the house of the Anglo-Colombian Development Syndicate. This is a company in which the three well-known British mining houses, the Consolidated Goldfields of South Africa, the Central Mining and Investment Corporation, and Johnson Matthey & Company, are interested. It holds a very large area of rich alluvial ground in the Chocó district, some 60 miles to the north of Buenaventura, containing



The forest-covered western slope of the Western Cordillera,
showing trail and railway in Dagua Gorge



The grass-covered eastern slope of the same range, showing mountain
trail fifteen miles north of Cali

EFFECT OF DIFFERING RAINFALL ON OPPOSITE SLOPES OF THE SAME RANGE

gold and platinum, which under Mr. Stapleton's directions has been very carefully tested in the last few years. As these results are satisfactory, the company is now preparing to energetically push the development of the property on a large scale. Mr. Stapleton is an American who, first interested in Ecuador, turned his attention to Colombia, and this country will remember him not only for his overflowing generosity to the Church, but for his persistent and successful endeavours for its development, and his staunch and untiring friendship for Colombia and the Colombians.

It was in this very Chocó district that platinum was first discovered, and as its value was then unknown, it was regarded by the Spaniards as worse than worthless because, owing to its similar specific gravity, it interfered with their getting clean gold. In the beginning it was thrown away. In 1824 Mollien reports that its selling price at this locality was 12 to 16 shillings a pound. Its present value is something over £8 per ounce, and it therefore affords but another example, of which there are many in modern industrial development, of the refuse and waste product of yesterday becoming the treasure of to-day. On account of its resemblance to silver ("Plata") they called it the "Platina de Pinto"—the little silver of Pinto—from the Rio Pinto, a small stream in the Chocó, where it was most troublesome because of its abundance. A few grains from this locality reached Sir William Watson, the English physicist, in 1741, by way of Jamaica, and he was the first to recognise it as a new element and to describe it as such in 1750. Its commercial worth was, however, not recognised before mining in the Chocó was virtually abandoned because of the freeing of the slaves. Platinum was discovered in Russia

in 1822 and 95 per cent of the world's supply has come from this source. The greater part of the remainder has come from the Chocó not as the result of any systematic work, but merely the little quantities brought in by negroes from time to time. Speaking not only of the Chocó, but of all of Colombia, which he knows very intimately, Mr. Stapleton expressed the opinion that the still undeveloped mineral wealth of Colombia makes of it "the richest section of the globe now above water."

Owing to the kindness of the railway authorities, our train was stopped near Mr. Stapleton's house, and we only learned afterwards that the Government officials and other notabilities had assembled at the station to deliver an address of welcome. They later called on Lord Murray at Mr. Stapleton's house and we spent the evening and the greater part of the following morning (July 31st) in official work and meeting various people, many of whom speak English.

Buenaventura is situated on an island called "Cascajal," which is about two miles long and a little over a mile broad, one fourth of which is mangrove swamp and the remainder rolling hills composed of poor, gravelly clay, which rise 40 to 50 feet above high-water mark. This island is in a direct line with the opening of Buenaventura Bay, and a storm coming from a little south of west would sweep directly on the town without impediment. Such storms, we are informed, are unknown; they must certainly be very unusual, as Mr. Burrows, the English local manager of the American Cable Company, who has been here seven years, told us that he had never known one to occur. The island is over seven miles from the mouth of the bay and

is therefore fully protected from storms from any other direction.

Thanks to its location on an island, where it receives the sea breezes, and to its rolling hill-land, it is capable, with the reclamation of the mangrove swamp and other low areas which would possibly form part of any comprehensive harbour improvement, of being made a very healthy and attractive city at the head of a broad forest-encircled bay which will not fail to favourably impress the incoming ocean traveller who, when the railway is completed, will find the 100-mile trip up the tropical lowland of the Dagua, through the rock-walled gorge, and over the crest of the Western Andes into the great and fertile garden of the Plain of Cali, an interesting experience seldom equalled anywhere, in novelty and diversity of scenery for so short a distance.

The town of to-day is a collection of two-storied, balconied, wooden and corrugated-iron houses and native palm-thatched huts, situated in a horseshoe of hills on the northwestern end of the island. It is neither better nor worse than many other tropical coast towns. It is a town of perhaps 1,500 inhabitants and is the principal settlement of a Municipio which, according to the 1912 census, has a population of 6,476. The main buildings are on a flat piece of ground which is partially covered by water at high tide, and as all the refuse of this portion of the town is dumped directly into this low place and the drainage from the other houses on the neighbouring hills flows into it, the general sanitary conditions of the town of to-day may be well imagined. This condition of affairs is, however, easily remediable, as it will be in time. However, such are the

natural geographic advantages of the port that its commerce has increased 150 per cent in the last four years. The town is reported to have suffered a severe earthquake on the 31st of January, 1906, followed by twenty-four minor oscillations, which caused a tidal wave about 30 feet high, broke the cable line and caused loss of life.

The first white man to land on the shores of the Bay of Buenaventura or the "Bahia de la Cruz" was Pascual de Andagoya, who had previously explored a portion of the coast south of Panama and had in 1537 been appointed Governor of the country along the Pacific, between San Miguel Bay, in what is to-day Panamá, and the mouth of the San Juan River. Setting out from Panamá on the 15th of February, 1540, to continue the exploration of his territory, he reached the Bahia de la Cruz, which happened to be outside of his grant; but this did not trouble him, as the policy of many of the early Spanish Conquistadores appears to have been to claim everything in sight—and a little more. Here he found an Indian trail leading down to the shore along which the Indians came from the interior for salt. This he followed, at first resisted by the Indians, but finally, by kind and just treatment, he won their friendship, and after an arduous journey, completed on the 10th of May, 1540, he reached the settlement which he calls Cali or Lili, and describes as a place containing thirty Spaniards. He then proceeded to Popayán, where, claiming that all this region was within his San Juan grant, he assumed the administration of all of the Province of Popayán. In this he continued for the few months which preceded the return of Belalcazar, by whom he was arrested and sent a prisoner to Spain.

Andagoya was thus the first European to pass from Buenaventura over the mountains to Cali and to show to the inhabitants of that place how advantageously they were situated with reference to this harbour on the Pacific. This newly discovered route at once became the established one between these mountain valleys and the Pacific Coast, and we find that within the following year Belalcazar, on his return from his successful mission to Spain, praying that he should be made Governor of the great territory he had conquered, went from Panamá to Buenaventura and thence to Cali and Popayán.

The town of Buenaventura was founded, under Andagoya's direction, by Juan Ladrillo in the summer of 1540 at a point, which, from certain physical features given in the accounts of Andagoya and Cieza de Leon, appears to have been on the present site—it could not, in any event, have been more than a mile away. Buenaventura thus represents the first Spanish settlement on the Pacific Coast of Colombia. There was nothing at the locality to justify a town, except as a seaport for the commerce of the western part of Colombia, and on the downfall of Andagoya the Town Council of Cali arranged that six or seven citizens should always reside at the port to receive goods. Even to-day the principal citizens of Buenaventura are rather in the nature of temporary inhabitants whose families live in Cali or neighbouring parts of "The Valley." There are, therefore, at Buenaventura none of the permanent buildings which one finds at other old Spanish coast settlements like Santa Marta and Cartagena and Panamá. Even the church at Buenaventura is of wood.

This old port has no patriotic sons to claim for her an

ancient lineage. The hearts of her important people are in "The Valley"—they esteem themselves not sons of Buenaventura, but sons of Cali, and so we find in several of the Colombian publications, as well as in the 1912 census, the statement that Buenaventura was only founded in 1821. Cali's patriotic sons claim for her the date of the founding of an earlier settlement, 14 miles away, and the date given in the census for another old city rests on a similar basis, only here the discrepancy is over 50 years, while the date assumed by many Colombian towns is the year they were first entered by the Spaniards rather than the date of the establishment of a Spanish settlement, and in one case the date of such a town, in the region of Bogotá, is given as the year preceding that in which Quesada, the first Spaniard to reach this locality, left Santa Marta!

Buenaventura has in the past been only a place of landing and departure—a mere appendage of Cali. The traveler, Gaspard Mollien, after commenting on the city which the natural advantages of the location would lead one to expect, describes the Buenaventura of 1823 as consisting "of a dozen huts inhabited by negroes, a barracks with eleven soldiers, a battery of three guns, and the residence of the Governor, built like the custom house, of straw and bamboo, on a small island covered with grass, brambles, mud, scorpions and toads."

There is a frog story connected with this region, and more particularly with the Chocó, which was a favourite one with the early travellers. Captain Cochrane in his "Journal of a Residence and Travels in Colombia," published in 1825, gives the following account of the source of the arrow-poison used by the Indian tribes of the West-

ern Coast. "The poison is obtained from a small harmless frog, called 'rana de veneno,' about three inches long, yellow on the back, with very large black eyes. It is only to be found (so my host informed me) in this place, and another, called Pelmar. Those who use this poison catch the frogs in the woods and confine them in a hollow cane, where they regularly feed them until they want the poison, when they take out one of the unfortunate reptiles and pass a piece of pointed wood down his throat and out at one of his legs. This torture makes the poor frog perspire very much, especially on the back, which becomes covered with white froth; this is the most powerful poison that he yields, and in this they dip or roll the points of their arrows, which will preserve their destructive power for a year. Afterwards, below this white substance, appears a yellow oil, which is carefully scraped off, and retains its deadly influence for four or six months, according to the goodness (as they say) of the frog. By this means, from one frog sufficient poison is obtained for about fifty arrows."

Colonel J. P. Hamilton, who was in Colombia in 1824 and 1825, as chief of the Commission sent by the British Government to the newly established Republic, gives a similar account in his "Travels Through the Interior Provinces of Colombia," published shortly after. His informant was Tomás C. Mosquera, afterwards President of the Republic, but then Governor of the Province of Buenaventura. In this account the "small green frog" is given as occurring in both the provinces of Buenaventura and Chocó, and it is stated that the frog is forced to yield his poison by placing him near a small fire. The poison is described as so virulent that "the jaguar or panther whose

blood is touched by one of the poisoned arrows soon becomes convulsed and dies."

Naturally the idea of a small green frog, entirely harmless, as found in its native haunts, exuding from its skin a deadly poison when tortured, seemed so strange and impossible that subsequent writers have been inclined to dismiss it as only a "traveller's tale," and to conclude that the poison was a vegetable one whose real origin the Indians sought to conceal by this marvellous tale.

Science has, however, recently shown that these travellers' tales are fact and not fiction. In 1911 Professor John J. Abel, of Johns Hopkins Medical School, announced the results of his investigations of "Poisons of the Tropical Toad—*Bufo agua*." This batrachian is reported by Dr. Abel to be the source of the arrow-poison used by the aborigines of the Upper Amazon, who make "from the creamy secretion that exudes from its skin glands, when it is irritated or overheated, a poison so powerful that it kills in a few moments large game such as the stag or jaguar." He found that the secretion, which is yielded from the skin when the animal is tortured, contains very large amounts of *epinephrin*, as well as a substance isolated by him and named *bufagin*, which is closely related to the *bufotalin*, that has only recently been obtained in crystalline form from the skin of the common European toad, and is the principle which gives to powdered toad-skin its curative power in cases of dropsy. Powdered toad-skin was an accepted remedy for dropsy by the best medical authorities in Europe until late in the eighteenth century. It was then ridiculed as a survival of superstition and so-called "black art," and considered not worthy of the serious

consideration of educated people. In all probability the original use of the remedy was prompted solely by the fact that to many people the toad is a very loathsome animal; but its continuation and general adoption was due to beneficial results repeatedly obtained, and, as Dr. Abel remarks, we have here another instance of the everyday observations of mankind at length justified by science.

With regard to the South American toad, Dr. Abel concludes: "We now understand why the secretion of the skin of *Bufo aqua* may be used as an arrow poison, since it contains the two powerful drugs epinephrin and bufagin, which in overdose act fatally on the heart and blood-vessels." The poison-frog of the Chocó has not been subjected to the same careful scientific examination, but whether or not it is the same species as *Bufo aqua*, the results of Dr. Abel's investigations on the Amazon Valley specimens are sufficient to give the stamp of truth to the early accounts, that the arrow-poison used by the Indians of western Colombia was procured from some batrachian in the manner stated.

Of the first trail between Buenaventura and Cali, Cieza de Leon, writing only a few years after the establishment of this settlement, says: "The only means of carrying merchandise from the port to the city of Cali is by the aid of the Indians of the intervening mountains, who carry it on their backs, for it is impossible to transport it in any other way. If it was desired to make a road, I believe that loaded beasts could not pass over it on account of the ruggedness of the mountains. It is true that there is another way, practicable for horses and cattle, by the river of Dagua, but they pass it in constant peril, and

many die by the way, while the rest arrive in such a sorry condition that they are of no use for many days."

Later, a road passable by pack animals was constructed between Cali and Juntas and the cargoes brought up by canoes were conveyed across the mountains on mules, but Mollien describes it in 1823 as one of the worst trails in the country, because of its muddiness and the very steep ascents and descents. In the nineteenth century, through the energy of General Mosquera, we are told, the present excellent trail of very easy gradient was blasted out of the rock walls of the Dagua gorge, and the short route from Cali to the head of canoe navigation thus established. The railway, commenced in 1878, in time replaced the transportation by canoes and will soon replace the mule traffic on the rest of the route.

After the day in Buenaventura, we returned on the first of August over the same route to Caldas. Again we had luncheon with the engineers at La Peñita, and this time had tea in the Dagua gorge with the engineers at "Naranja." It was a very pleasant experience. Again we were the guests of Dr. Barrios at Caldas. On the following morning, accompanied by the senior engineer of the railway, Dr. Luis L. Guerrero, we were conveyed in a special train over the new portion of the line between Caldas and the last station, La Cumbre, near the crest of the range at the pass of Cresta de Gallo, which is 15 miles north of the point where we crossed the summit near San Antonio on our way to Buenaventura. The railway crosses the Dagua at Caldas and, passing the old settlement of Papagayeros, which will soon disappear because of the nearness of the new railway town of Caldas, ascends the

side of the mountain in a series of broad loops laid out with great engineering skill, and passing through a number of excellently constructed tunnels, finally reaches La Cumbre, a distance of 15 or 20 kilometres. This portion of the line is laid with fifty-five pound rails; the maximum grade is reported as 2.5 per cent, which shows how utterly inexcusable are the high grades in the lowlands towards Buenaventura. We were greatly impressed with the general tidiness and finish of the construction of this part of the work and with the engineering efficiency shown. It is a great monument to the Technical Director of the work, Dr. Rafael Alvarez Salas, and his able and enthusiastic corps of assistants. At La Cumbre we were met by Dr. Salas, and, after a delightful luncheon, proceeded on another special two miles to the present rail-head. Here we mounted our animals and continued along the partially completed grade toward Cali.

This railway has suffered many vicissitudes, and when it finally reaches Cali it will indeed represent to that town a partial realisation of expectations long deferred. It is a line of 3-foot gauge which when completed will have a length of only slightly more than a hundred miles. Its construction was begun in 1878, and from the present condition of the work we do not expect that it will reach Cali before 1915. Cisneros, who commenced this work, was forced to abandon it after constructing about 12 miles. It was then undertaken by an American contractor and is now being completed by a Colombian company. Only 40 miles of the line were completed in the 30 years ending 1908, at an expenditure of approximately £1,000,000 (\$5,000,000 gold), or an average rate of £25,000 (\$125,000) per

mile, and this result becomes even more astounding when it is remembered that 34 miles of this is below the gorge of the Dagua, including the first 12 miles, which will have to be rebuilt some time, and that the remaining 6 of the 40 miles which is in the gorge was entirely wrecked by the flood of 1912, together with much of the track below. The road seems to have been dogged with misfortunes.

The ride along the new grade was quite delightful; there were no trees to intercept the view, for we were again on the treeless eastern slope of the range. We looked down on a mule trail, just a narrow line of white wriggling up the sides of the range, and, three miles from La Cumbre, suddenly passed around a hill point from which there is a perfect view of the great plain. Here is the broadest and flattest portion of the valley, locally called the "Llano Grande." On its western side, at the very foot of the mountain, is the sinuous, many-looped Cauca, with a narrow fringe of trees, flowing through miles and miles of pasture lands with only occasional fields.

Beyond to the east is the high range of the Central Andes whose rugged slopes tower above it, culminating to the southwest in the snow-capped, triple cone of Huila, and to the northeast in the lesser snow peak of Santa Catalina, and beyond each of these to the north and the south, the range continues until it loses itself in the distance. This is the land of "María." From this point on the new line, the site of her home is visible due east across the valley on the first low foot-hills of the Central Range.

"María" is the literary masterpiece of the Colombian writer, Jorge Isaacs. First published in 1867, it has had many editions, and is known and loved wherever the

Spanish tongue is spoken. For those who cannot read it in the original, there is a most happy and sympathetic English translation by Rollo Ogden, published by Harper & Brothers, with an introduction from the gifted pen of the able author and literary critic, Thomas A. Janvier. Of this story of Colombian life, Janvier says: "But the side of the story which comes nearest to my own heart—because of the warm feelings bred of pleasant memories which it arouses there—is its beautiful and its absolutely truthful portrayal of life in a Spanish-American home. The author shows, without any apparent effort to show it, the gracious relations existing between the several members of these charming households which are ordered with a patriarchal simplicity, which are regulated by a constant courtesy, and which are bound together by an ever-present love. Homes of this sort, my own experience has convinced me, are not the exception but the rule in Spanish-America; and this perfectly-finished picture of one of them, in its perfectly-described setting of a countryside community, exhibits the genius of the people more accurately than would an exhaustive study of all other phases of their life combined.

"I cannot but hope, therefore, that the story of 'María' will do something more than give delight to its readers by the beauty of its theme and by the excellence of its art. For I am well satisfied that, showing as it does these stranger neighbours of ours as they truly are, it must tend to the accomplishment of a larger and a higher purpose by fostering a desire among us to transform them into friends. This seems to me a most natural conclusion; for my own experience has shown me that they need only to be known in order to be loved."

When in the future the trains reach this point three miles from La Cumbre, we hope, if the day is clear, they can halt for the few moments which is all that will be necessary for those of the passengers who see "The Valley" for the first time to receive such a mental picture that they will never forget it. Perhaps even better, the tourist should stop at the health resort which is sure to arise at La Cumbre to replace San Antonio, and by little excursions to neighbouring eminences get not a single memory picture, but a whole series under the greatly varying conditions of light and shadow.

The new grade gradually descends the mountain side in a single enormous loop, but we, by cutting across this and going directly down the mountain, soon reached the level floor of the valley at a point only a short distance beyond the little settlement of Yumbo, twelve miles north of Cali. Here the new grade passes very close to a great bend in the river, and following the most travelled trail, we found ourselves at a landing on the river bank, where there were several rafts of timber and other material for railway construction. We retraced our steps, but this little side trip suggested that Cali under normal conditions of traffic will lose her river trade to a settlement which will spring up here.

For many years a controversy raged as to where the railway line should cross the range. The inhabitants of Cali insisted it should go through the pass of San Antonio (6,620 feet) and thence to Cali without entering the plain en route. The alternative proposal was that it should be built over the lower pass at Cresta de Gallo (5,216 feet) and enter the plain a number of miles to the north of the city. Finally

the present route over the lower pass was adopted, with the possible consequence we have just mentioned. A further result in the same direction will be entailed if the railway is extended northward from the point where it first reaches the plain. Such a plan would create an important junction here on the banks of the river, and would rob Cali of all of its commercial advantages. There will doubtless be a merry struggle when the exact location for any extension of this line to the north comes to be fixed.

Continuing along toward Cali, we found various parts of the grade of the railway completed and others in progress, and again crossing the old Spanish bridge over the "Rio Grande," we dismounted at the "Gran Club" just at dark on Saturday night, the 2nd of August. During our stay at Cali, I visited one of the coal mines about half a mile from the town and in the hills on the northwest side of the "Rio Grande." This coal bed, which has been known and worked in a small way for many years, is three to four feet thick, almost vertical (65 to 80 degrees), and the coal has been crushed to small bits by the severity of the earth movements. All the product of the mine is composed of small slickensided bits of coal, which is apparently of a good bituminous grade with coking properties. It is stated that the coal-bearing series can be followed along the face of the mountains for about six miles north of Cali and extends to an unknown distance south. The high angle of the dip of all the known deposits in this vicinity, which is not conducive to economical mining, together with the probability that much of the coal is badly crushed, limits their prospective value to local consumption.

There is a possibility that this coal-bearing series under-

lies a portion of the contiguous Plain of Cali and that here the beds will be flat or gently inclined and the coal will not be shattered into small bits as in the present known deposits. If this proves true and the depth is not prohibitive, the region of Cali will become an important coal mining centre, but not otherwise.

Monday morning we made our farewell calls on the Governor and other officials, who, by the instructions of the President of the Republic, had been most thoughtful for our comfort, and at 2 o'clock, with Mr. Stapleton, and several gentlemen of the town, we left Cali on the tram for the river landing, a distance of about four miles. The terminus at the river bears the pretentious name of "Puerto Mallarino" and consists of a landing-stage and a few frame-houses. Here we boarded the 40-ton steamboat "Cabal," built at the Yarrow Yard in Glasgow, and carried in pieces over the mountains from Buenaventura, and we are now on our way down the beautiful river to Cartago, where we begin our climb over the Central Andes.

SIX

CALI TO BOGOTÁ

Bogotá,

Carrera Nueva No. 213,

17th August, 1913.

It is indeed a pleasure to be again in hospitable Bogotá, where the welcome from the numerous friends of our former stay in the capital has been most hearty. It is good to see them again and to know that their friends and relatives, whom it has been our good fortune to meet in distant parts of the Republic, are but added links. We miss the genial, keen, intelligent face of Monsignor Montagnini, the able and versatile representative of Rome to the Republic of Colombia, and can but hope that the illness which has caused his return to Europe is but a temporary one, and that he may soon again continue his work at Bogotá, which promises much both for Colombia and for the church.*

Our thousand mile journey across the Andes is now only a memory—although a glorious one. The first stage of the journey, covering a few miles from Quito, was by automobile, the last, from the Magdalena to this mountain-park in the Eastern Andes, by railway; there was a 120-mile trip on the beautiful Cauca River and disjointed bits by railway between Cali and Buenaventura, but the remaining 650 miles, which is approximately the overland distance on the most direct route between Bogotá and Quito, was in

* Mgr. Montagnini died in Europe only a few months later.

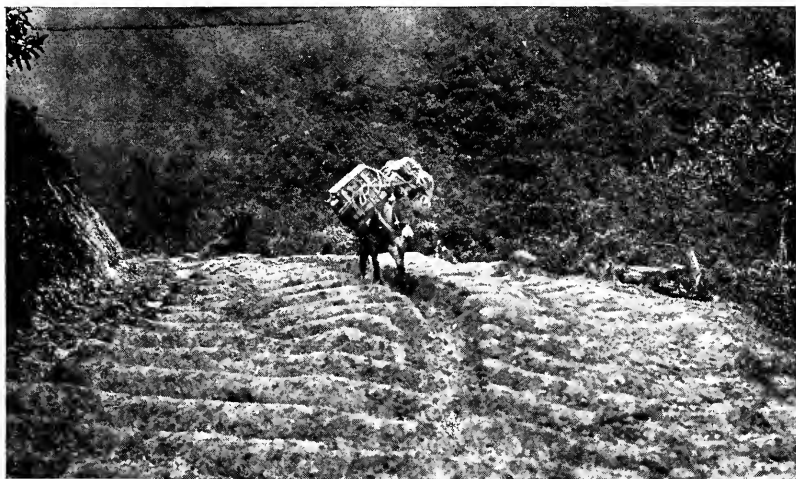
the saddle. The inevitable difficulties and annoyances of such a trip are now but amusing recollections, and the brain is crowded with pictures and impressions of a vast region embracing land in two Republics, beautiful, fertile, with greatly diversified scenery and climate, part in the regions of eternal snow, part as high mountain-uplands of temperate climate, part as lower valleys of sub-tropical and tropical character, and part as a narrow, torrid coastal belt of tropical rains and jungle. It is a region which is sparsely populated in comparison with its possibilities, and one in which there will, in the fulness of time, be many people, knit by easy and adequate railway communications into great and powerful nations.

From the roof of our house, here in Bogotá, we look westward, in the clear air of the early morning across the "Sabana," which is the local name for this well-populated mountain-park, and through a gap in its low western rim see 85 miles away in the Central Andes the beautiful symmetrical snow-capped cone of the old volcano Tolima, shimmering in the light of the morning sun. It is a picture which would delight the heart of a Japanese artist, and, aside from its own satisfying beauty, it brings to mind our struggles along the Quindió trail which crosses the Central Range just to the north of its white summit. We know that between us and Tolima lies the broad, sloping, semi-arid plains of the upper portion of the low-lying Magdalena Valley, while beyond is the justly famous Cauca.

Our trip down the Cauca River in the steamer "Cabal," which was commenced on the afternoon of the 4th of August, and completed about sundown on the 6th at the port where one leaves the steamboat for Cartago, was one



Our pack mules coming out of the clouds, eastern side of the range



Cross ridges typical of mountain trails of Colombia and Ecuador

THE QUINDÍO ROAD

of the most pleasing experiences we have had during our sojourn in South America. The air was balmy, there were delightful, gentle breezes, beautiful mountain chains on either side of a broad fertile plain containing a happy and care-free population, feathery bamboos in clumps here and there, and groups of contented cattle on the sand-bars at every bend of the river. There is all the beauty of tropical vegetation without the density which characterises it in a region not shielded from the tropical rains in the manner in which this valley is protected by the mountains to the west.

The river was quite low, and it was feared that this trip would be the last for the season. During some years it is possible for the steamboats to run between the ports of Cali and Cartago throughout the year, but generally navigation is suspended for some months owing to low water; and it happened only a few years ago that no boats were able to run for a period of eighteen months. Only during high water is navigation possible at night; usually, as was the case during our journey, the boat ties up to the bank at nightfall and starts again at daybreak.

On our way down the river we passed a sister ship on its way to Cali. There are three such boats now on the river, all belonging to the "Compañía de Navegación del Rio Cauca"; two of 40 tons and one of 28, all well-built and equipped, comparing favorably with the river steamboats of other regions. The upper limit of navigation on this portion of the Cauca is La Bolsa, near the hamlet of Buenos Aires, about thirty-five miles above Cali, and the lower limit is twelve miles north of the landing for Cartago, at the rapids called the Salto del Sopinga. This upper portion

of the river is thus navigable for about 170 miles. From this point for 200 miles north the river is a turbulent stream broken by rapids. It is then again navigable for steamers which pass down the river to the ports on the Magdalena.

The impression of this region which one gets from the deck of a steamboat is of a great pastureland, thinly settled, and but sparingly tilled. To obtain a more comprehensive idea of the cultivated lands it would be necessary to go overland, for the principal settlements are all away from the banks of the river. The last census returns indicate that Palmira is a town second in importance only to Cali, and the tobacco of this locality has long been famous. There is also near this town the sugar factory of Manuelita, one of the two modern sugar mills in Colombia. It is an ideal sugar country, where production ranges from 50 to 80 tons per acre, without manuring or serious cultivation, where the cane is reported to reach a length of 20 feet in exceptional years, and where the cutting and grinding can go on throughout the year, even during the two rainy seasons which in "The Valley" extend from March to May and from September to November, but it has not developed through want of adequate transportation facilities. Cocoa does well, and coffee thrives on the adjoining mountain slopes, but the principal industry of "The Valley" is cattle raising, and the view from the river is therefore typical though not comprehensive.

The total population of the Plain of Cali, or "The Valley," as it is affectionately called by every Colombian—and with ample reason—is, according to the last census, 200,000, including the inhabitants of the towns. The Indian population of the same region at the time of the Conquest is

stated by Perez to have been calculated by the historians at one million people, and the careful writer, Cieza de Leon, who was a soldier in one of the first expeditions to penetrate this region, wrote in 1541: "All this valley, from the city of Cali to these rapids, was formerly very populous and covered with very large and beautiful villages, the houses being close together and of great size. These villages have wasted away and been destroyed by time and war; for when Captain Don Sebastian de Belalcazar, who was the first captain to discover and conquer this valley, made his entry, the Indians were bent on war and fought with the Spaniards many times to defend their land and escape slavery. Owing to these wars and the famine which arose on account of the seeds not having been sown, nearly all the Indians died." The remainder, unable to defend themselves, were carried away and devoured by the cannibal hill tribes, and so he concludes: "But the great valley of Cali, once so fertile, is now a desert of grassy land."

Since we have been in the Plain of Cali we have found the map of the "Valle del Cauca," covering the region from Jamundí northward half-way to Cartago, on a scale of 1 to 400,000, prepared by the Colombian geographer, General Vergara y Velasco, very useful. In Ecuador we found the Wolf map, published in 1892, to be the most complete and accurate representation of the geography of the country, but since we have been in Colombia it has been a matter of using several different maps. Wolf's map of Ecuador extends, with topographic detail, as far as Pasto, and is still the best general map of the extreme southern portion of Colombia. There are also the maps of the Codazzi Survey, published in 1864, which are the mother-

maps of all the general maps of Colombia prepared since that time. It is however possible to supplement these with the sketch maps of Vergara, and for the modern boundaries of the departments and for recent developments, with the Vidal map of the Republic, published last year.

The work of Codazzi is an enduring monument to the energy, perseverance and ability of that intrepid geographer, as well as to the broad and farseeing public spirit of General Tomás Cipriano de Mosquera, several times President of the Republic, and one of the outstanding figures of its history. Agustín Codazzi was an Italian by birth and fought with Napoleon, and later in Colombia in the Wars of the Independence. Having shown marked ability in the construction of a map of the state of Zulia (Venezuela) as a subordinate in the Ministry of War, he was in 1830 commissioned to make a survey and map of the whole of that country. This he completed in 1839 in a manner deserving all praise. In 1849 he was made chief of the Comisión Corográfica by President Mosquera and entrusted with the making of a map of Colombia. In the execution of this task, he showed during the next six years almost superhuman activity and energy, travelling thousands of miles and covering all the Republic except the Departments of Bolívar and Magdalena on the north. His work was then interrupted by civil wars, and he had just begun the completion of his surveys of the north when he was stricken with fever and died after a few days' illness in 1859. The surveys were continued in Magdalena and Bolívar, but in a much less efficient and complete manner, by his former assistants, and in 1864 the cartographical results, prepared by Manuel Ponce and Manuel Paz under the direction of

General Mosquera, were published as ten maps, one covering the whole of the Republic on a scale of 1 to 1,350,000 and the others covering each of its nine Departments on a scale of 1 to 810,000.

Francisco Javier Vergara y Velasco, General of Engineers, and like his predecessor, Codazzi, connected with the Army, has laboured prodigiously for many years on the geography of his native country. His "Nueva Geografía de Colombia," published by the Government in 1901, is a very voluminous compilation of the contributions of previous writers to the detailed geography of the country and is a work which every student of the geography of Colombia must have. He has collected in this work a list of elevations determined throughout the country by different investigators, each set being presented as a unit and, except in the case of some of the highest peaks, without any attempt at correlation or adjustment. Most of the elevations which we give in these letters are based on data derived from these tables, but we have used as a basis for rough adjustments his short list of the altitude determinations of the Intercontinental Railway Commission. The work contains many sketch maps showing additions and corrections to the results of the Codazzi Survey, together with many cleverly conceived diagrams illustrating the broader geographic relations, which one could only wish had been engraved and printed in a manner more in keeping with their merit.

The maps by Vergara which we have used are, however, from a work issued as a series of brochures between 1906 and 1909 and bearing the rather misleading title of "Atlas Completo de Geografía Colombiana." The work consists

of eight parts of which only the first seven appear to have been published. They contain a series of sketch maps varying in scale and detail which serve to supplement the more carefully engraved maps of the Codazzi Survey. Vergara's work represents the results of a self-trained enthusiast carried forward solely by his own initiative under many difficulties and to a considerable degree with his own limited means. A great deal of credit is due him.

The map of the Republic of Colombia by Enrique Vidal (scale 1 to 2,700,000), published in Medellín in 1912, is little more than a reduced copy of the general map of Colombia resulting from the Codazzi surveys, on which the position of the railways is indicated, but on which there have not been incorporated some of the corrections which Vergara has published. Its chief value lies in the facts: (1) That it is more easily obtained than the rare 1864 maps, and (2) that it is the nearest approximation to the present divisions of the Republic which has been published, and is indeed commonly supposed to represent them. Although bearing the date of 1912, the divisions shown, namely fifteen departments (including Panamá), one territory and three intendencias, are approximately correct only for the year 1910. A number of new divisions were made in 1911 and one in 1912, and the map to be correct, as of the date which it bears, should (if Panamá is included, as it is in the National Census of 1912 and other official publications) show fifteen Departments, two Intendencias, and seven Comisarias, namely:

Departments—

1. Antioquia.
2. Atlántico.

3. Bolívar.
4. Boyacá.
5. Caldas.
6. Cauca.
7. Cundinamarca.
8. Huila.
9. Magdalena.
10. Nariño.
11. Panamá.
12. Santander.
13. Santander del Norte.
14. Tolima.
15. Valle del Cauca.

Intendencias—

1. Meta.
2. Chocó.

Comisarias—

1. Arauca.
2. Caquetá.
3. Putumayo.
4. Juradó.
5. Urabá.
6. La Goajira.
7. Vaupés.

These changes affect the boundaries on the Vidal map of the Department of Antioquia, Nariño, Boyacá, the Intendencia of Chocó (from which Juradó and a part of Urabá have been cut out) and the Territoria del Caquetá which, with certain additions from the Department of

Nariño, is now represented by the Comisariás of Putumayo, Caquetá and Vaupés.

The departmental boundaries are in error in other respects, but whether these are due to uncertain descriptions in the laws creating the divisions or to subsequent changes, we do not know. Certainly a portion of what is shown by Vidal as northern Huila, and including the towns of Alpujarra, Dolores, Prado, Santa Rosa, Carmen and Cunday, is in the Department of Tolima, and the boundary between Cauca and Nariño is in error in certain respects, as San Pablo on the north side of the Mayo is, according to the 1912 census, not in Cauca, but in Nariño. Really the task of the geographer who would keep his map up to date respecting the changes in the boundaries of the major political divisions in this country is a strenuous one and the casual traveller finds ample reason for inhabitants of little settlements near the boundaries of the Departments occasionally stating they cannot tell in what Department they are living!

Much work, having for its object the preparation of a new map of the country, has been done in the last few years by the "Oficina de Longitudes" in charge of the able and energetic Colombian Engineer, Dr. Julio Garzón Nieto, with three or four assistant engineers. This bureau is singularly enough under the Ministry of Foreign Affairs, but this is due to the fact that it was originally created for the purpose of establishing the international boundary between Colombia and Venezuela. Dr. Nieto and his assistants have spent many months each year laying the foundations for this new map by determining the latitudes and longitudes of the various cities and hamlets throughout

the country. The longitude determinations rest on time-signals very carefully exchanged by special arrangement over the telegraph lines of the country with the National Observatory at Bogotá, the position of which has now been determined with the aid of time-signals over three routes: (1) By the telegraph line through Venezuela and cable from La Guaira; (2) by the telegraph line to Santa Marta and wireless from that point to Washington, and (3) by the telegraph line to Buenaventura and cable from there to Panamá and thence to the United States. The telegraph lines in Colombia now have a very great extent and the number of points whose position can be determined exactly in this manner is sufficiently great to give a very satisfactory net for map control. Many points not reached by the telegraph lines are also being determined, with only slightly less precision, with the aid of chronometers carefully checked at the telegraph stations at the ends of the routes followed. In the preparation of local maps and sketches to be adjusted between these determined points, many engineers throughout the country are collaborating with commendable zeal with Dr. Nieto and his colleagues. The initiative of this work seems to be due to the progressive spirit of former President Reyes, himself an explorer, but its continuation by his successors is a good index of Colombian progress. The maps are being drafted by Departments. The one of Antioquia, we are informed, is about ready for publication, but the whole work will take several years to complete. However, when the traveller now reaches Cartago and starts on the Quindío trail there is nothing better available than two of the maps in Vergara's "Atlas Completo de Geografía Colombiana." One by him-

self entitled "El Quindío y los Nevados" and the other a map of the trail with accompanying profile by H. Huot.

La Fresnada, the port of Cartago on the Cauca River, is 2,875 feet above sea-level and consists of a large store-house, built high on the bank of the river, and a few small farm-houses. There were no accommodations to be had here and no saddle animals waiting to convey casual travelers the three miles to Cartago, and we were greatly relieved when the Captain, with true Colombian courtesy, kindly arranged that we should occupy our cabins on the boat for the night. Early the next morning (August 6th) our saddle animals, which the faithful José had driven overland from Cali, were at the landing and, mounting, we were soon in Cartago. Here we found the arrieros and pack-train which the Governor of the Department had directed by telegraph should be waiting for us, but the head arriero very firmly informed us that it was a feast-day and he and his men therefore could not start on the journey until the following morning. The effects of a feast-day, in this country as elsewhere, are sometimes such that arrieros are unable to move on the following day, and the prospect was, therefore, not very satisfactory. Mr. Stapleton, however, came to the rescue; he found the parish priest was an old friend whom he had known as curate at Buenaventura, and when the priest gently informed the head arriero that Mr. Stapleton was a true son of the church, and suggested that he start at once, he quickly agreed that he was ready to commence the journey whenever we desired.

In the meantime we had asked that luncheon be prepared, and it was arranged that we leave Cartago at one



The Quindío road near Quebrada Gallegos, showing cera palms



Trail in the sloping plain between Ibagué and the Magdalena, and one of the hills which project through this recent filling

BETWEEN QUINDÍO PASS AND THE MAGDALENA

o'clock. The acting prefect, who had been advised by the Governor to expect the arrival of Lord Murray, called at the hotel and, among other things, very gravely informed us that Cartago was the oldest town in Colombia. It was quite evident that this loyal son of Cartago sincerely believed that this town was all that he claimed it to be, and his statement affords but another example of the intense local patriotism which inevitably develops where there are inadequate means of communication between different parts of a country.

It so happens that the name of Cartago was chosen, as Cieza de Leon, who was present at the first foundation, explains: "Because all the settlers and conquerors who had accompanied Robledo had set out from Cartagena, and this is the reason the name was adopted." The Cartago of the present location is generally considered to date from the end of the sixteenth century, but an article by Carlos Hoyos R. in the "Revista Nacional de Colombia," of December last year, gives the date as 1691, which may be a misprint for 1591.

The original Cartago was founded on the banks of the Rio Otún, fifteen miles from where the town now stands, by Suero de Nava, under the orders of Jorge Robledo, in 1540. It was moved to its present site near the Rio la Vieja because this was an important junction of ways of communication. The two routes along the Cauca from the north, one through Anserma on the west side of the river, and the other through Arma on the east, united at this point. Here also was the western terminus of the Quindío trail, even to-day the most important route over the higher part of the Central Andes, which formed the

connecting link between these western settlements and the then newly established Ibagué and other towns of the Upper Magdalena and Eastern Andes. From this point also led a trail, then much used, to the rich goldfields of the Chocó. Cartago's importance thus grew out of its location at the junction of these several important ways of communication. With changing transportation conditions, its importance has tended to diminish, and the Cartago of to-day has the rather unkempt aspect of a town which has seen better days.

The acumen shown in the choice of the site for the original Cartago has been most strikingly and singularly vindicated in the last half century. For over 200 years there were but a few cabins on the old site, which rejoiced in the name of "Cartagoviejo" (Old Cartago). Then the thrifty sons of Antioquia cleared the thickets of bamboo on the Otún and laid out a new town which they called Pereira. This place has grown so rapidly that it is now the centre of a municipio, which, according to the 1912 census, has, like Cartago, a population of slightly over 18,000 people. The accounts which reach us and the photographs we have seen indicate that fifty-year-old Pereira is a much more important town than the transplanted, two-century-old Cartago, which impresses one to-day as a town of 5,000 to 10,000 people.

Many of the early Spanish towns were, like Cartago, changed from their first sites. In this region alone the towns of Cali, Buga, Arma and Toro are all in positions different from the settlements to which the names were first applied, but in none of these cases, save Cartago, have the sites first occupied become towns of importance.

Cartago was at one time, as is apparently true of almost every one of the older Colombian towns of importance, the capital of a Department; but its brief career as the chief city of one of the major political divisions of the country lasted only twenty-five days. The political restlessness of the Colombian people is perhaps in no way better exemplified than in the continual change in the number, size, and shape of the major political divisions of the country. A record of these changes is given below:

*Changes in Number of Departments or analogous Divisions in
Colombia (including Panamá)*

1820.....	1	1851.....	31
1821.....	4	1852.....	35
1822.....	5	1853.....	36
1831.....	18	1858.....	8
1832.....	19	1863.....	9
1835.....	20	1904.....	10
1843.....	20	1905.....	15
1846.....	22	1908.....	35
1849.....	25	1909.....	10
1850.....	29	1910.....	15

It was at old Cartago that Cieza de Leon in 1541 began writing the journal of his travels. This, as finally published in 1553, under the title of "Parte Primera de la Cronica del Peru," covered the period from 1532 to 1550, and records his painstaking observations on the topography, resources, habits and customs of the aborigines, and the work of the Conquistadores in the regions through which he marched as a soldier, under one leader after another, from Urabá on the Caribbean Coast to the very southern edge of Peru. It is one of the most remarkable literary productions of the time of the Spanish Conquest, and, with the other works he afterwards completed, has made

of him the foremost original authority on the history and conditions during these first days of the Conquest.

The English-speaking people are indebted to Sir Clement Markham for a sympathetic translation of this wonderful record, and to the Hakluyt Society for its publication. Of the writer Sir Clement, in his "Incas of Peru," says: "Imagine a little boy of fourteen entering upon a soldier's life in the undiscovered wilds of South America, and, without further instruction, becoming the highest authority on Inca history. It seems wonderful, yet it was at the early age of fourteen that Cieza de Leon embarked for the New World. When most boys are at school, this lad was sharing all the hardships and perils of seasoned veterans. It is certainly most remarkable that so fine a character—humane, generous, full of noble sympathies, observant and methodical—should have been formed amidst all the horrors of the Spanish-American Conquest."

Among the Conquistadores there were many who treated the Indians with kindness and consideration, and Cieza de Leon was one of these; but the scenes he witnessed as a lad under some of the leaders he served were more than enough to blunt and change a character less strong. In his prologue he says of his work: "What I have written here is concerning true and important things. The attempt savours of temerity in so unlearned a man, but others of more learning are too much occupied in the wars to write. Oftentimes when the other soldiers were reposing I was tiring myself by writing; neither fatigue nor the ruggedness of the country, nor the mountains and rivers, nor intolerable hunger and suffering, have ever been suffi-

cient to obstruct my two duties, namely, writing and following my flag and my captain without fault."

He began the writing of his narrative when he was in his twenty-second year, after he had been a soldier in America for eight years, and he explains the initiation of his work in the following words: "As I noted the many great and strange things that are to be seen in the New World of the Indies there came upon me a strong desire to write an account of some of them."

The Indians of all the depression between the Central and Western Andes he describes as generally cannibals; a few of the smaller tribes did not eat human flesh, some only ate it on important occasions, while others systematically reared children for food. Their houses in the Plain of Cali and northward along the Cauca were commonly constructed of bamboo with a palisade of sharpened canes surrounding it, and in some tribes it was customary to decorate this palisade with the heads of their enemies. In others the skins of the deceased were stuffed with ashes and so preserved. Of clothing they had but little, and this was of coloured cotton cloth, woven and dyed by themselves. In many regions there was much gold, and here they fashioned ornaments and culinary vessels of this metal. Near Antioquia he found the Indians used scales to weigh the gold; but to the aborigines the thing of greatest value was salt, and those tribes which possessed salt-springs did a thriving business with their neighbours, exchanging salt "for gold, cotton cloths and other things." Between the sites of the Spanish towns of Arma and Antioquia he found two Indian villages where there was much salt, and nearby, he says, there was "a

very large ancient road by which the people communicate with those to the eastward." The Indians cultivated maize and various edible roots, as well as cotton, and from the maize they prepared a "wine" of which they were apparently inclined to drink very freely. The most popular beverage in the rural districts of Colombia to-day is but little different from this "wine made from maize," which the Spaniards found the Indians manufacturing.

In the region of Cartago and on the mountain slopes to the east and north he found evidence of cultivation by peoples preceding the tribes the Spaniards found in this locality. He says these former inhabitants "could not have been few, judging by the remains of their works, for all the dense bamboo thickets seem once to have been peopled and tilled, as well as the mountain parts where there are trees as big around as two bullocks."

Our luncheon completed at the little hotel at Cartago, where the talkative acting prefect proved a very entertaining guest, we set out along the Quindío trail. The road soon climbs a low spur of hills and from here there is a good view of the city nestling against the foot of this rolling ground, with its one prominent church tower standing out sharply against the band of green made by the belt of trees along the Cauca River, and with the Western Andes towering up in the background, dwarfing the town and its buildings. It seems strange to see so large a town without surrounding cultivated fields.

After climbing the "Cuchilla Santa Barbara," here rising 1,400 feet above the city and representing the low northern end of the Montaña Calarma, a spur of the Central Andes, the trail descends again to the Rio La Vieja, which it

crosses about five miles from the city at the Paso de Piedra de Moler, on a modern suspension bridge. The La Vieja, on its course to the Cauca, touches Cartago, and, when the time comes for modern wagon-roads in this region, one would expect the road to follow the river valley and so avoid this needless climb. In the evening we occupied a room set apart for travellers in a little adobe house at the hamlet of La Balsa, 18 kilometres from Cartago and near the boundary between the Departments of Valle del Cauca and Caldas.

We are now well started on the Quindío trail which, beginning at Cartago on the edge of the Plain of Cali, 2,950 feet above sea-level, climbs 8,400 feet in a distance of 42 miles, and, crossing the Central Andes, or Cordillera del Quindío, at a local depression called the Boquerón or opening, descends to Ibagué (4,200 feet) on the edge of the great sloping plains of the Upper Magdalena. The distance along the trail between the two cities is only about 75 miles, but such is the character of even the "improved" trail of to-day, that it is a good three to four days' journey, even under the best conditions. In dry weather it is not particularly difficult, but its character during times of rain is such that it has an unenviable reputation throughout the length and breadth of Colombia, and even into Ecuador. In the northern part of the Cordillera del Quindío it rains during April, May and June; there is then, in July, a slight break, or "short summer," then rain for August, September and October, and then a "long summer" of dry weather running through November, December, January, February and March.

Colombia is so near the Equator that the only change

in seasons experienced at any point is between wet and dry, and this has given rise to an interesting colloquial usage of the words winter and summer. During wet weather it is naturally cooler, and hence seasons of wet weather have become known as "winter," and the seasons of dry weather, "summer." The best time to cross the Quindío trail is, therefore, towards the end of the "long summer" of November to March. We are just a little late for the next best period, which is the end of the "short summer" of July. From this time on the trail will grow steadily worse.

Dr. Garzón Nieto, the chief of the Oficina de Longitudes, in his official report on the field work of his Bureau for the year 1910, published in the "Boletín del Ministerio de Relaciones Exteriores," gives the following account of his journey over this route in early September of that year: "On the 30th of August we left Cartago in the direction of Ibagué. Some days later I joined Señor Garavito in Ibagué, and from there informed our Minister of the condition of that trail, which is nothing more than a graveyard of men and animals, along which we counted as many as nineteen dead bodies of animals in a distance of four kilometres. The animals are continually slipping over enormous slopes, losing themselves and their packs in many instances. In order to save our instruments we had to carry them on our shoulders over the greater part of the road. At intervals we put them on oxen, but this is a means that is not satisfactory. The traveller is obliged to go on foot the greater part of the distance, using his arms to force a passage through the bramble bushes growing along the sides. Between Salento and Ibagué, to cover

which requires as much as four days, the road is practically an inhospitable desert. The trail is an absurdity for the entire length, and, considering its actual condition and the fact that other much shorter and better ways exist, we believe that it would be better and more economical to make a precise survey and start a force to make a new trail to replace this one."

In the dry seasons transportation along this route is by horses and mules, but in the wet season these are, to a greater or less extent, replaced by oxen which, though slower, are stronger and better able to cope with the hardships of the route. For many years, as we have seen was also true of the road from Cali towards Buenaventura, the sole beast of burden over the Quindío trail was the Indian. The greater importance of the route from Cali to the sea caused it to be improved before the way over the Quindío, and as late as 1824 Colonel J. P. Hamilton reports that there were 200 to 300 peones engaged solely in carrying persons and baggage over the Quindío. His own party, which passed over this trail in December, was supplied with these "cargueros," or carriers, and he describes their equipment as follows: "The machine on which they carry the baggage is a sort of frame of bamboos, about three feet long with a cross-piece at the lower end, on which they put their load. It is secured with straps made of the bark of a tree, which first cross the burthen, then go over the shoulders and across the breast of the peon; another strap passes over his forehead, which is fastened to the top of the bamboo at the back. They are careful to put a pad between the strap and the head, and between the chair and the loins, to prevent chafing. They are

naked, excepting a handkerchief tied around the middle. The sillero on which they carry people is much the same as the silla de carga above described for baggage, excepting that the sillero has rests for the arms and a step for the feet. The usual load of a peon is about 100 pounds, but many carry a greater weight, and some have been known to carry eight arróbas (or 200 pounds). With these weights they climb the mountains with the greatest ease, and seldom stop to rest. The juez politico of Ibagué, in talking afterwards of these men, said that they seldom lived beyond forty years, being generally carried off by the bursting of a blood-vessel or by pulmonic complaints."

This journey of Colonel Hamilton from Cartago to Ibagué required nine days, even though it was made in the dry season in December, and the condition of the road was such that he met some oxen carrying very light loads of salt. With the improvement of the trail the cargueros have disappeared, though women and children unable to ride are still sometimes carried on the backs of men or in sedan chairs. Indian carriers are, however, still to be found in the less developed parts of Colombia and Ecuador; some we have seen were really carrying almost incredible loads, and a mining engineer told us he had known one man to carry as much as 350 pounds as a load over a difficult trail.

Colonel Hamilton records that the dwellings of the small village of La Balsa, which was our first stop on the Quindío road, were at the time of his journey the last dwellings seen by the traveller until he arrived near Ibagué. To-day, however, there are many settlements along the trail and, on the western side of the summit, several important towns.

Leaving La Balsa on the morning of the 8th of August and travelling through the Department of Caldas, we noted many new clearings and buildings in the region visible from the trail, and more evidences of recent "pioneer" development than we have seen in other parts of Colombia. During the day we passed through the town of Finlandia (established in 1878), where we had luncheon, during a heavy shower about noon, in a nice little hotel on the Plaza, and at nightfall reached picturesque Salento, founded in 1865.

Salento, which is 35 miles from Cartago and slightly over 6,000 feet above sea-level, is on a terrace at the western foot of the main slope of the Central Andes. The country between Salento and Cartago is a region of low rolling hills; indeed, the greater portion of it is only a slightly dissected plain which slopes gradually from an elevation of 6,000 feet at the foot of the main mountain mass to an elevation of 3,500 feet at the edge of the narrow La Vieja valley near the bridge. It is separated from the lower and more horizontal Plain of Cali by the range of hills which we crossed immediately after leaving Cartago. The soil is slightly sandy, apparently quite fertile, and this dissected plain could support a large population. Between Finlandia, which was only a waste place when Colonel Hamilton passed over this route, but is now the centre of a Municipio containing over 10,000 people, and Salento, a spur of the mountains enters the plain; this is crossed at El Roble (6,500 feet) and the road then descends sharply to the clear waters of the Rio Quindío to climb again to the terrace of Salento which is but a portion of the plain described. The view of Salento and the sur-

rounding mountains from the trail near El Roble is like a beautiful bit of Italian landscape, and is one of the picture spots of our journey.

The development of this fertile and healthy region neglected for many years—as many other parts of Colombia are neglected or but sparingly settled through want of people—is due to the Antioqueños, the most virile stock in the Republic. Laborious, energetic, frugal, the Antioqueños are the reputed descendants of the ancient influx of Jewish blood which came to Spain even before the time of the Cæsars and was for centuries the nobility of the land. Swept out of Spain by the indiscriminate fury of the Inquisition, when everyone was suspected, many of those who were already Catholics found refuge in the new colonies, while others, such as the family from which the great British Prime Minister and statesman, Disraeli, sprung, went to other and at that time more tolerant nations. Spain thus drove away the people who constituted the agricultural backbone of the motherland; but the loss of Spain has been the gain of other regions, and Colombia not the least of these, for the Antioqueños have done much, first for the Colony, and, later, for the Republic.

The Antioqueños have large and sturdy families,—the present President of the Republic, himself an Antioqueño, is one of a family of twenty-two children. These alone, of the people of Colombia, have been capable of furnishing, to any considerable degree, the population to energetically continue the development of the country. Spreading out from the original centre in the upland region of the Central Andes, around Medellín, these people have been primarily responsible for the development and growth of the

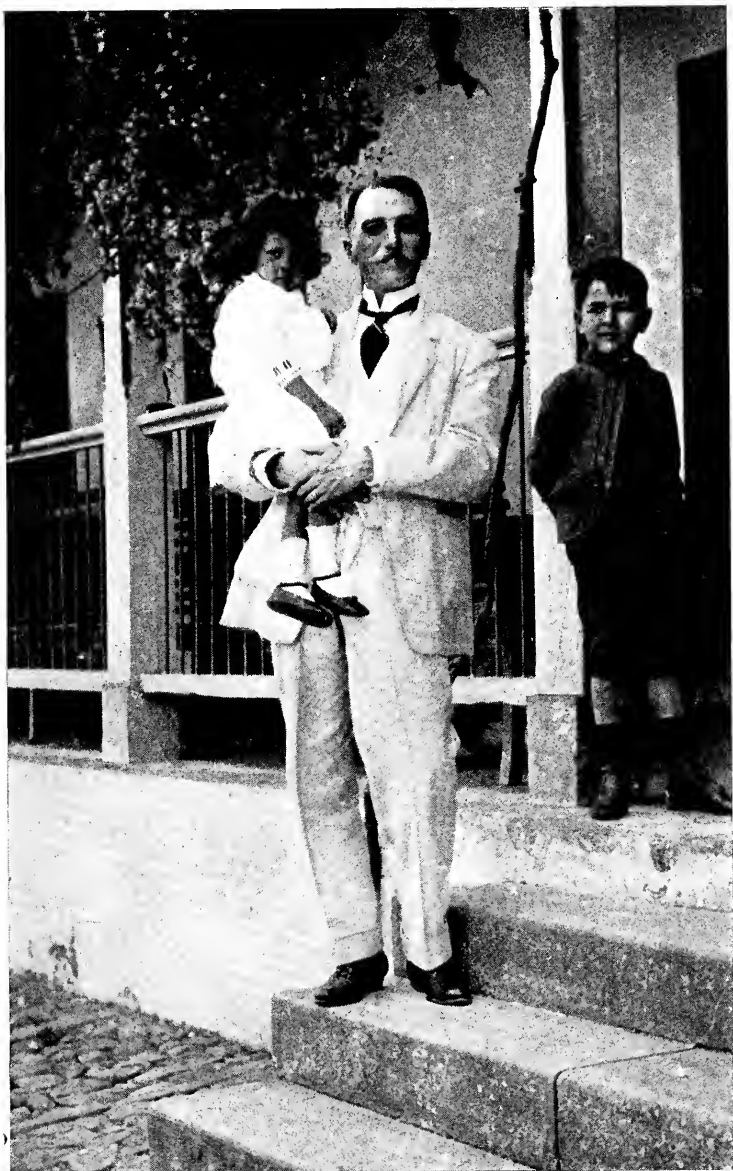


Photo by Sr. Carlos Caballero

HIS EXCELLENCY DR. D. CARLOS E. RESTREPO
President of Colombia, 1910-1914, at a hacienda near Fusagasugá



area which is now the Department of Caldas. This Department is unique in the Republic in the newness of its settlements—a region not with an important past, but rather a glorious future. Of its thirty-two *municipios*, representing a population of 340,000 people, only three are foundations made before 1800; only six were established prior to 1850, and the Department's growth is thus virtually of the last half century. The dates given in the last Census Report for Cundinamarca, with its 109 *municipios* and 714,000 people, show only two settlements since 1800; Tolima, with 35 *municipios*, gives 11 established since 1800; Nariño, though the figures are very incomplete, gives only one, and Santander gives 20 out of 70.

Salento is a small village, the centre of a *municipio* of 3,728 people, and here we spent the night in the partially completed municipal building. This is a two-storied frame structure built in the form of a hollow square with verandas encircling the inner side of the building. Three sides of the square are finished, but on the fourth there are only the two verandas, and on the upper one of these we opened our cots and bedrolls and spent the night, glad to be out of the heavy rain which soon fell.

It was still raining gently when we left the town on the following morning, the 9th of August. The trail starts at once steeply up the side of the mountain over a clay soil, which the rain had made very slippery. Even the sure-footed mules, who were in better condition than our horses, found the road very trying, and on several occasions fell to their knees. So accustomed does one become, after a long ride, to rely entirely on these trail-wise animals that the too trustful rider is sometimes aston-

ished to find himself in the mud by the roadside; however, though some of our party had surprises of this nature, the experiences, which might have been serious, turned out to be only amusing.

From the trail above Salento we had most beautiful views, even through the mist, of the valley of the Rio Quindío; here flanked on both sides by high and rugged mountains covered with luxuriant vegetation, including many palms and tree-ferns. The flat floor of the valley has been cleared of all undergrowth and trees except the palms, whose feathery foliage shows as dots on a great grass carpet. We were quite disappointed that the inclement weather prevented us from seeing the snow-mountains,—Tolima and the clustered half dozen lower snow-peaks just to the north of it,—of which we were told there were good views from this part of the road in clear weather.

The distance from Salento (6,050 feet) to the summit of the pass (11,350 feet) is seven miles, and the climb is a steady, steep one, with scarcely a level place to afford relief for the animals, which we stopped cross-wise on the trail from time to time for a breathing spell. It was almost noon when we reached the summit, and here we halted to rest the animals and to partake of the luncheon which we had brought in our saddle-pockets. It was unpleasantly cold here with the characteristic paramo dampness and chill, and during our stop the cold drizzling rain became a dense, moist, cold cloud which enveloped us and everything about us. The road to this point, except for its steepness and slipperiness, was not bad, but when at the summit we passed from the Department of Caldas into the Department of Tolima, it became one series of mud-

holes, with occasional sharp, narrow rocky ridges over which the animals slipped and stumbled in an uncomfortable fashion, for the trail in many places is cut out of the precipitous side of the mountain, and the valleys yawn to depths which are unfathomable through the mist. The road continued to grow more difficult, and we encountered again and again the same cross-ridges we had met before in the Paramo of Mojanda in Ecuador. Here we passed a number of carcasses of pack-animals, who had succumbed to the hardships of the trail and on which the vultures were feeding. Under the weather conditions it was a most dreary and dismal place. A horse which we had brought with us from Pasto could go no further, but by coaxing and with patience we got him below the clouds to a hovel of a hut, where there was good pasturage and there we left him. Here the sunshine was welcome, the deep valleys beautiful, the extent of the cultivation of the mountain sides surprising, reminding one of the wonderful agricultural region in Nariño. In clearing these mountain sides, the inhabitants have destroyed all the trees and brush except a species of palm, slender, tall and graceful, which, under the existing conditions, forms one of the most noteworthy features of the landscape. This is the cera palm, which furnishes the building material for many of the houses of the region, and supplies wax and other useful products to the people. Not only are the sides of the houses made of the trunks of this palm, but, split in half, they form the roof, laid from the roof-tree to the eave like gigantic tiles.

While the trail on the west side of the mountain is one steady climb, the trail on the east from the summit to

Ibagué is a series of ups and downs. Although it would be possible to take the trail from the summit immediately into the valley of the Tochechito and to construct a trail with an easy gradient along this drainage and thence around the point of the hill to Ibagué, the present trail keeps about a mile or two from this drainage and crosses spur after spur of the mountains. Again and again after descending to the level of a tributary and crossing it, it zigzags up a spur 1,000 to 1,500 feet and then falls down the other side to another tributary stream and begins the laborious climb of the next spur, and so on, in a manner heartrending because so unnecessary.

Although we had planned to spend the night at a place called San Juan, where we were told good accommodation could be obtained, and although from the crests of the ridges we could see this promised spot, we could also see the road over which we must pass to reach it and, when the sun passed behind the mountains, we decided to stop at the first hut and not try the trail in the dark. It was a filthy place, already filled with people, and we were quite willing to yield the space allotted to us on the clay floor in front of the open fire to the arrieros, José, and Mr. Stapleton's "boy." A small tent, which a very kind friend had presented to Lord Murray at Quito, was set up, and in it we had a very jolly dinner out of our provision boxes, quite optimistic that the drizzling rain would soon cease. The tent was not large enough to hold more than one cot, and as Mr. Stapleton had not been very well Lord Murray insisted that he occupy it. The other two cots were placed nearby in the open, and our bedding carefully arranged in our great waterproof sheets. We were just

drowning off when the drizzle turned to a deluge. It did not seem like rain-drops, but like bucketfuls of water, and this kept up throughout the night. In the morning the rain was over and the figure stepping from the tent chaffingly said it really was "a rotten tent, in fact nothing but a sieve." Examination showed a rather streaked inside, but a perfectly dry cot, while the two cots on the outside, which were from a well-known London house, were made of such excellent canvas that when we lifted off our bedding there was in each a pool of water which the canvas had refused to let run through to the ground! If the tent had been made of the canvas of our cots, and, for this occasion, our cots had been made of the canvas of the tent, all would have been happier.

Piling our somewhat damp equipment on the cargo-animals, we left "the camp of the deluge" and proceeded over the up-and-down trail toward a place with the promising name of Eden, where we planned to spend the night, but as our chief arriero was not very familiar with the trail or perhaps was not on very good terms with the people of Eden, we stopped at a house on the bank of a beautiful little mountain stream, 5,600 feet above sea-level. Here we set up our cots on the veranda of the house, but this proved a rather inadequate shelter from the heavy rain that fell during this second night.

We began the next day with a heartrending climb up a steep, slippery clay hill, and passing the misnamed Eden, soon reached the crest of a low spur called La Palmilla (6,300 feet). From here the trail follows the crooked crest of the ridge between the Rio Coella and the Rio Combeima. After a time we began to get glimpses of

Ibagué, a city at the mouth of a beautiful mountain valley on the edge of a great plain stretching, it seemed to us, as far as the eye could reach. The descent of the trail just before reaching the town is very steep, but it is here broad and well graded, and crossing the modern toll bridge over the Rio Combeima (4,000 feet), we entered the city at one o'clock on the 11th of August, just four days from the time we left Cartago.

Ibagué is the first of the cities we have encountered on our journey from Quito which was founded by those in control of the "Nuevo Reino de Granada," of which Santa Fé de Bogotá was the capital. The cities through which we have passed thus far owe their origin to the conquest of Peru, and those which lie in Colombia were founded by an expedition from Ecuador. They represent cities established from the Pacific and not from the Atlantic, for even the expedition of Cesar and Vadillo, which came from the Atlantic up the Cauca, founded no cities, and it was not until this expedition reached Popayán and the greater portion of it returned northward as the soldiers of that province under Robledo, that Cartago, Arma, Antioquia and the other early towns of Antioquia were founded.

Ibagué was the outpost of the colonisation which came from the Atlantic and was founded by the order of the Judge of Santa Fé de Bogotá, Andrés Lopez de Galarza, in an endeavour to obtain a footing in the land of the fierce and war-like Pijoa Indians. Like many of the early Spanish settlements, it was originally established at a site quite different from the one it now occupies. The old site, which was only a few miles to the southwest of our stopping place

THE LOCATION OF IBAGUÉ



near Eden, was abandoned within a year, and in 1551 the present site was adopted, because the first was too exposed to the attack of the Indians. Even in the new location the inhabitants suffered severely for sixty years from constant warfare with the Pijoas. It has long been a town of importance, and since 1831 the capital of a Department with varying boundaries. This Department was at first called Mariquita, later Tolima, then for a short time Ibagué, and now again Tolima, and most appropriately because of the majestic old volcano of that name which lies within its borders in the Central Andes. Ibagué is often described as at the foot of Tolima, whose summit is some eighteen miles northwest of the city and rises over 14,000 feet above it. We had been told that from this place, as well as from a number of points on the Quindío trail, excellent views could be had of this mountain, but the climatic conditions were against our enjoying this pleasure, and our personal acquaintance with its beauties is therefore limited to a contemplation of it on numerous occasions from Bogotá, and glimpses of it and Ruiz from the Magdalena.

Tolima is frequently regarded as the highest mountain in Colombia, and perhaps when the heights of the peaks of this country are accurately determined by precise surveys this may prove to be true. It lies very near the centre of the country, if we do not consider the unsettled Llanos and Selvas regions lying east of the Eastern Cordillera, and it would be an interesting coincidence to have the master-peak of the country near its centre of population. Its competitors for the distinction of being the highest mountain in the country are: (1) The relatively nearby Huila, 130 miles to the south in the same range; (2) the

Sierra Nevada de Chita, the culminating point of the eastern range, which lies to the northeast of Bogotá and one-third of the distance to the Caribbean; (3) the Sierra Nevada de Santa Marta on the very northern shore of the Republic. To these might be added Cayambe, which, according to the boundary claims of Colombia, is part in Colombia and part in Ecuador, though Ecuador claims the whole of it. There is some evidence in favour of Cayambe being the highest of the five, as the several determinations of its height vary within relatively narrow limits, and indicate it to be somewhat over 19,000 feet, though a few of the determinations of the four strictly Colombian peaks give them a greater height.

Of the four wholly Colombian peaks, Humboldt concluded that Santa Marta, with an elevation of 18,550 feet, was the highest, while Montenegro, a quarter of a century later, awards the distinction to Tolima with an elevation of 18,325 feet. Codazzi made no determination of Santa Marta, but he concludes that Chita, with an elevation of 19,493 feet, is higher than either Huila or Tolima. As between Tolima and Huila, Caldas concluded that Tolima was 272 feet higher than Huila, while Codazzi found Huila was 276 feet higher than Tolima!

Vergara is of the opinion that the most reliable determinations of these four peaks are as follows:

- | | |
|--|-------------|
| (1) Tolima (according to Caldas)..... | 18,437 feet |
| (2) Huila (according to Caldas)..... | 18,155 feet |
| (3) Santa Marta (according to Caracristi)..... | 17,128 feet |
| (4) Chita (according to Vergara)..... | 16,679 feet |

The determinations by Caldas made a hundred years ago rest on observations on the boiling point of water by this

careful scientist. The position of Chita as the lowest of the four seems fairly well established, notwithstanding the great height recorded by Codazzi and confirmed by Mosquera, because the observations of Humboldt, Montenegro, Hettner and Vergara all agree in making it a peak of the 16,000 to 17,000 order of magnitude. Santa Marta is given as 17,500 feet by the English engineer, Simons, who conducted surveys in Colombia between 1874 and 1886, and made for the Colombian Government maps of the Departments of Bolívar and Magdalena to complete the Codazzi set. Bretes, the French traveller, found it to be 17,010 feet, while the English Admiralty Charts record it as 16,500 feet. Therefore, there seems ample reason for neglecting the extraordinary figure of 26,000 feet obtained by Mosquera as the height of this mountain, and for concluding that the Sierra Nevada de Santa Marta and the Sierra Nevada de Chita are both of a height inferior to Tolima and Huila.

Between Tolima and Huila there seems to be little basis for choice. Either may easily prove to be the higher. Most of the determinations of Tolima agree that it is a mountain between 18,000 and 18,500 feet high, but there is also a determination of its elevation by triangulation by the German engineer, C. Faulhaber, made late in the last century, which gives a result of slightly over 21,000 feet.

Huila, Chita and Santa Marta are relatively simple peaks, but Tolima is but one point in a very elevated composite mountain mass of old volcanoes, whose other summits are Quindío, Santa Isabel, Santa María, Cisne, La Olleta and El Ruiz, the last of which is also called the "Mesa Nevada de Herveo," and is twenty miles north of

Tolima. This closely clustered group of snow-eminences will still rank as the highest important mountain-mass in Colombia, even should the tip of one point on the triple cone of Huila prove slightly higher.

The volcanoes of this group are now dormant; there are a number of thermal springs and occasional fissures, below the snow-line, which have been observed to give forth a little steam mixed with sulphuric acid gas, and toward the Ruiz end of the group the snow has sometimes been observed to be slightly tinged with yellow near the old craters, suggesting a discharge of sulphurous gas. At the time of the Spanish Conquest some one of this group was a smoking mountain, for Cieza de Leon records in 1541 "the snow mountains which are a part of the great chain of the Andes are 7 leagues from the villages of this province of Quimbaya, in which Cartago is situated. In the highest parts of these mountains there is a volcano which on a clear day may be seen to send forth great quantities of smoke." On the 12th of May, 1595, there was an eruption which is reported to have devastated much of the old Province of Mariquita. It is described as a "foul mud" by Friar P. Simon, and, from his account, came from a crater on the northern end of the group and not from Tolima.

Situated 4,000 feet above sea-level, with its mild and healthy climate, the Ibagué of to-day is a prosperous looking place, and is the centre of a Municipio, which, according to the 1912 census, has a population of 24,693 persons. Here the Governor of the Department, with his Secretary, called on Lord Murray and invited the party to be present at the banquet to be given that evening as the finishing touch to the "fiesta" we saw in progress, and which, indi-

cating the number of Antioqueños who have settled in these parts, was in honour of the Independence of Antioquia.

To the east of the town stretches a great plain sloping toward the Magdalena, a gigantic composite alluvial-fan broken here and there by low rocky ridges that project through the recent outwash. So gradual is the slope that one riding across it can scarcely believe, were it not for the increase in heat, that in the 50 miles between Ibagué and Girardot he has descended 3,000 feet. Near sundown on the 11th of August, after our pleasant stop of a few hours, we left the city and started on our ride across the plain. The moon was nearly full, and after five hours' ride across this apparently horizontal grass-covered rather arid plain, only sparsely settled and with little irrigated patches here and there, we reached the road-side inn, "Mi Casa," also called the "Hotel Buenosaires," where we were received in great good humour and a not elaborate but very satisfying supper prepared for us. As an instance of the indistinct character of even the "main road" in places—it may be mentioned that Mr. Stapleton, notwithstanding his many years on the plains of Western Nebraska, while riding a little ahead of us, was misled by a cow-trail and turned aside, and only rejoined us later.

The following day we saw many of the conical mounds of the termite, or white ant, dotting the plain. Some of these are eight to ten feet in height, and approach in size the more famous examples in Africa. Toward noon we reached the modern suspension bridge over the Rio Coella, at Chicoral (about 1,750 feet above sea-level), and as the heat was rather intense, and as our saddle-pockets were well

filled with food, we decided to have luncheon, linger by the river-side, and ride into Girardot by moonlight.

After a time we started slowly along the road, but soon had the unwelcome news that the toll-bridge across the Magdalena at Girardot, which we would have to cross to reach the town, was closed promptly at nine o'clock. Our animals were very tired after the long journey, but they responded well to the emergency, and at just three minutes before nine we clattered across the bridge into the town.

At some unknown point between the Bridge of Chicoral and this bridge over the Magdalena we crossed the route followed by that energetic and intrepid conqueror, Belalcázar, for though we seemed, at Ibagué, to have passed beyond his domain, it is nevertheless true that, starting from Popayán in 1538, he crossed the Andes and proceeded along the west bank of the Magdalena to a point fifty miles north of Girardot, where he was met by a brother of Quesada and questioned as to his intentions. Finally he crossed the river and went to Tena and the Sabana, where his soldiers joined those of Quesada and it was agreed that after his departure for Spain with Quesada, Captain Cabrera should return and found the town of Neiva, which should be considered as belonging to the Province of Popayán.

During the last few miles of the journey we saw the track of the Tolima railway, a 3-foot gauge line with light rails, of which the construction—because of the levelness of the land—has consisted in little more than laying the rails on the surface. It extends from the river at Girardot 25 kilometres to Espinal, and seems to have very little excuse for existing. Perhaps some day it will reach Ibagué,



A TERMITE OR WHITE ANT HILL IN THE MAGDALENA PLAIN



but its usefulness will be dependent on the uncertainties of the Magdalena navigation until the completion of north-south trunk lines from the Atlantic.

One of the railway projects which one hears most frequently discussed in Colombia is a plan to connect Bogotá with the sea at Buenaventura by a railway passing over the Quindío. Of course, there is already the rail communication between Bogotá and the Magdalena at Girardot; there is a start from Girardot toward Ibagué, and there is the line from Cali to Buenaventura, but to link these up by means of a line across the rugged Andes is a project for which there seems little economic justification, as the cost of construction would be entirely out of proportion to the results secured. The better parts of Colombia lie in two belts extending north and south, one between the Western and Central Andes, and embracing the Antioquian highlands of the Central Andes, and the other extending along the Eastern Andes. North-south trunk lines along these belts with their main terminus at a common port on the Atlantic coast, and in the case of the Western line with a connection to the sea at Buenaventura, are the lines which must ultimately be built, and the Quindío project is at best but a makeshift which would only postpone the realisation of adequate transportation facilities.

Girardot is a relatively new town which owes its importance to the fact that it is the terminus on the Magdalena River of the railway lines from Bogotá. It is a busy little town, the centre of a Municipio with a population of 10,402, and as it is only 1,000 feet above sea-level is quite in the "Tierra Caliente," here rather arid. Like Cartago it was for twenty-five days, during the time in 1908 when

the Departments all bore the names of cities, the capital of a Department. To-day it is the chief city of the Province of Girardot, one of the twelve divisions of the Department of Cundinamarca, for when we crossed the bridge over the Magdalena we passed from the Department of Tolima into this Department, which, with many changes in its boundaries, is the most ancient in the Republic. In the beginning of "La Gran Colombia" it covered the whole of what is to-day Colombia.

In the connection between Girardot and Bogotá there are two railway lines, which together link the capital and the Magdalena. The first of these, the Ferrocarril de la Sabana, extends from Bogotá across the tableland twenty-five miles to Facatativá, and the other, the Colombia National Railway, or Ferrocarril de Girardot, falls down the steep western face of the mountains from the upland edge near Facatativá and then follows the valley of the Rio Apulo and the Rio Bogotá to the Magdalena. These are two very distinct railway lines, for the Ferrocarril de Girardot has a track a yard wide, while that of the Sabana Railway is a meter, and therefore all passengers and goods must be transferred at Facatativá from the carriages of the one line to the other. The two tracks are so nearly the same gauge that it is not possible to lay a third rail, as is frequently done in the western United States to enable cars of a narrow gauge line to run on a broad gauge. The construction of the Girardot line was begun in 1881 by Cisneros, and although the distance involved is only 82 miles it was not completed until 1909. The total outlay expressed by the capital of the company and its four bond issues is £2,380,000, or something like £30,000 per mile,

and the first portion of the line, where there are no engineering difficulties, was constructed by Cisneros like the line near Buenaventura, with indefensibly steep gradients and curves. The climb from Girardot to the summit is 7,900 feet, while the Cauca railway climbs only 5,200 feet, but, like its unfortunate sister-line on the west coast, it has been dogged with misfortune; the work has been interrupted by revolutions, floods on the streams have carried out the bridges, and land-slips in the soft shales, which make up the greater part of the mountain face, have caused much difficulty.

We left Girardot on this line at seven o'clock on the morning of the 12th of August, Lord Murray and his companions in a private car and our faithful animals in the horse-car. The horseman rides up to the train, his animal goes into the horse-car, and when he alights at his station out comes his horse or saddle-mule, and he gallops off to his destination.

The first settlement of importance along the line is the old town of Tocaima, 28 kilometres from Girardot, but midway between the two places we passed the leper colony of Agua de Dios, which contained 3,746 persons in 1912. There are two other places in Colombia set aside by the Government for lepers, one at Contratación, not far from Bucaramanga, and the other at Loro, a few miles south of Cartagena, the first with 2,899 inmates, and the second with 148. The great Quesada, conqueror of the Eastern Andes and founder of Bogotá, is reputed to have succumbed to this disease at Mariquita in 1579.

Tocaima, 1,280 feet above sea-level, was founded by Hernando Venégas Carrillo de Manosalva in 1544, eight

years after the establishment of Bogotá. In its neighbourhood are famous medicinal springs, thermal, gaseous and sulphurous, extending over a radius of three miles, which we understand are used by many people.

The low hills covered with stunted semi-arid vegetation, which have thus far been some distance from us, now close in and force the railway to follow the very bank of the river. We soon reach Juntas de Apulo, 39 kilometres from Girardot, where the Rio Apulo joins the Bogotá. Here there is to be seen from the railway a very pretentious hotel but partially completed, and apparently neglected for some years—a monument to an ambitious dream which was not carried out. One of the routes surveyed for the railway was along the Bogotá and entered the Sabana by way of the great waterfall of Tequendama, but this was finally abandoned for the route along the Apulo.

Near Apulo is the estate of former President Rafael Reyes, one of the most energetic and progressive Presidents that the Republic has had. It is due to his initiative that agricultural experiment stations were established in this vicinity. The cotton experiment farm, established in 1906, has apparently been allowed to lapse, but the farm, started to determine whether or not a wine industry is possible in Colombia, is still continued privately by Monsieur Charton, with most satisfactory and promising results. This experimental vineyard is located between Apulo and Tocaima. The Agricultural Experiment Stations maintained by the United States Government and by many of the States have been a great factor in the agricultural development of that country, as they must also in time be-



Paved road at El Tambo and pack-ox with a "load" of salt



Indian house and draught oxen on old paved way near Esperanza

OX TRANSPORTATION

come in Colombia when, as we expect, the Government again turns its attention in this direction.*

As we continue up the valley of the Apulo, the hills on both sides increase in height. At the station of Anapoima (51 kilometres) the ridge between this river and the Bogotá rises only 300 feet above the track, but passing San Joaquin (58 kilometres), the flat-topped hill of La Mesa comes in sight, the top of which is 2,000 feet above this point. Soon we begin the real climb of the mountain face, and at San Javier, the little station for La Mesa (72 kilometres), the top of the Mesa is only 1,000 feet above us. Here and at Hospicio (5 kilometres beyond) there are numerous vendors of tropical and sub-tropical fruits, and the passengers eagerly buy baskets to take to their friends in Bogotá. For some years San Joaquin, then San Javier, then Hospicio, was the terminus of the railway, and the traveller proceeded on mule-back up the old Spanish way, in places almost a stone staircase, through La Mesa, Tena, Tambo, and Boca de Monte to Barroblanco, on the edge of the Sabana, and thence to Madrid on the Sabana Railway.

The railway twists and turns, and towards noon we reached Esperanza, about 4,000 feet above the sea, where the train stops to allow the passengers to have luncheon at the delightful hotel which has been established at this point. The temperature here is very pleasant, and it is a favourite resort for the families of Bogotá, and is destined to grow increasingly popular. The little garden and look-

* The Pan-American Bulletin, of April 1915, announces that the Department of Cauca has engaged an agricultural expert to establish a School of Agriculture in Popayán.

out command a magnificent view of the broken foot-hills country—below is the Apulo, beyond the low hills of the valley of the Magdalena, and in the distance the Central Andes; to the south, only a few miles away, and at the same elevation, is the slightly sloping, little table-land of La Mesa, with the tiny looking buildings which form part of the town. Around Esperanza everything is green, although there is not enough rain for the heavy forest growth which occurs higher up the mountain side. In the dry upper Magdalena valley region the winds must rise high before they yield much moisture. Continuing the climb from Esperanza, the train passes through a coffee plantation, and in time enters the local belt of heavy tree growth. Along this western face of the Eastern Andes this belt varies greatly in both position and width, as it is affected by many local conditions. It is, however, commonly narrow.

Beyond this we pass through a short tunnel and enter the little village of Zipacón (8,185 feet), where the hill-sides are fairly peppered with primitive coal mines, each only a rough shed with a hoisting apparatus worked by a man or a mule. We are now within the borders of one of the two ancient Kingdoms of the Chibchas—a people who had made considerable advancement toward civilisation at the time of the arrival of the Spaniards. Zipacón was the western-most of their villages along this route, and near here, as elsewhere along the frontier, the Chibchas maintained a border force, called the Guechas, to guard against attacks from the more warlike and less civilised tribes which occupied the country through which we have just passed.

It is now unpleasantly cold for those who have come

from the torrid banks of the Magdalena, and there is a rush for overcoats or any sort of clothing which will give a little added warmth. Soon we reach the summit (8,950 feet) and begin the descent to the Sabana 375 feet below, and once over the crest it seems much warmer, probably because of the shelter from the wind afforded by the rim of the basin. A fellow passenger points out some big rocks near the track on which he says there are Indian hieroglyphics, and immediately beyond we get a glimpse of miles and miles of flat plain which is almost at once lost to view behind the little group of hills that partially separate the flat of Facatativá from the rest of the plain.

Facatativá is in a little pocket representing the most western point of the Sabana, and the railway station here is just $6\frac{1}{2}$ feet higher than that at Bogotá twenty-five miles away, near the southeastern corner of this plain. Surrounded by a low rim, the floor of the Sabana is like the impression of a rude hand, with a very short thumb to the west, on the tip of which is Facatativá. Between the fingers are long narrow ridges rising 300 to 1,000 feet above its surface, and there are half a dozen wart-like masses along its southwest side, on the prolongation of the thumb to the base of the hand. The first finger, a long, flat-bottomed valley through which the Rio Puebloviejo flows, extends twelve to fifteen miles northeast of Facatativá, the second finger, with the Rio Frio, a like distance from the great level palm. The third and fourth fingers are separated at the point they leave the palm by Cerro de Suba, which rises 300 feet above the flat. The third finger is here occupied by the Rio Funza, also called the Rio Bogotá, the main drainage channel of the Sabana,

while along the fourth runs the Northern Railway and the Gran Carretera Central del Norte (the great central wagon-road of the north). These two fingers coalesce in about six miles, and after continuing together for nine miles again separate. The tip of the third finger is thirty miles northeast of the palm, and that of the fourth forty miles, and these two fingers must thus be regarded as having special extensions comparable to the nails of the hands of the wealthy Chinese, whose facial features are sometimes strongly suggested by the physiognomy of some of the aborigines. The squatty palm is twenty miles broad and only ten miles long, with Bogotá on one side of the wrist, and Soacha on the other, near the railway station for the Falls of Tequendama. Little spur valleys extend south from Soacha and Bogotá, six miles to Sibaté in the one case, and nine miles toward Usme in the other. The extreme length of the Sabana from the tip of the fifth finger southwest to Sibaté is thus 55 miles, and its extreme width 25. The great mountain-park of which this is the floor is somewhat larger.

Facatativá was an important place in the land of the Chibchas, and Mr. William Lidstone, an English engineer, now employed by the Girardot Railway, has promised to show us the rock pictures which are to be seen in the caverns nearby. The ruler of the Chibchas of this part of the country bore the title of Zipa; his kingdom was seventy miles wide and ninety miles long, and his capital was at Bocatá, also called Muequetá, in the very palm of the Sabana. Most of the history and traditions of these people was irretrievably lost during the early days of the Conquest by the ruthless destruction of all the more advanced

of the people. It is known from the early Spanish chroniclers that the Spanish found a number of Chiefs or Usques subordinate to the Zipa. It may be inferred from the distribution of these various chiefdoms, as shown on the map of the "Geography of the Chibchas," by Vergara, that at some distant time the people of the chiefdom of Bocatá, which occupied the greater part of the palm of the Sabana, growing more powerful than their neighbours, because of their better land, extended their domain, and the Usque of Bocatá became the Zipa or King of the surrounding Chiefs.

When the Spaniards advanced on Bocatá the Indians suffered several defeats, and abandoned their capital city. The Zipa then found a refuge at Facatativá, and was supposed by the Spaniards to have taken great treasures of gold with him. His place of retreat having become known through the capture of two boys suspected of coming from the Zipa as messengers, one of them dying of torture without revealing the secret, and the other divulging it only after prolonged agony, a night march was made on Facatativá, the royal camp surprised, and Tisquesusha, the last of the Zipas but one, mortally wounded. He is reported to have been moved from the battlefield by his followers and to have died near the present site of the town. The Spaniards secured only two golden drinking-vessels which had been conveyed here for the personal use of the sovereign.

We found the railway station at Facatativá piled high with goods in boxes much battered by the many handlings to which they had been subjected in the numerous changes necessitated by the present means of transportation from the coast. The town is to-day the centre of a municipio of 10,534 people, and during one of the periods when the

Colombians created a Federal District around the capital city of Bogotá, based on the American idea of the District of Columbia, in which Washington is situated, it was for a time the capital of Cundinamarca. While the luggage and mails were being transferred from one train to the other we had tea with Mr. Harry W. Cutbill, an Englishman connected with the administration of the Girardot Railway, and then, entering our special car, passed between two hills and out upon the palm of the Sabana—a great fertile plain covered with pastures and fields, growing the crops of the temperate zone, with here and there clumps of eucalyptus around the hacienda buildings, and occasional avenues of them along the roads. To the eye the surface appears perfectly horizontal and the railway levels show an average slope from Facatativá to the Rio Funza or Rio Bogotá of less than 10 feet per mile.

The Sabana Railway is in itself a record of the energy and perseverance of the Colombians, for this line was built long before the Girardot Railway was completed, and the bringing of the locomotives, cars and other equipment for twenty-five miles of line 8,000 feet up a mountain side, in order to build a railway in the mountain-park on its summit, is no mean undertaking, and its successful accomplishment was quite an achievement. A cart-road was first constructed, commencing at Facatativá and reaching the Magdalena at Cambao, some distance north of Girardot, and, by a strange coincidence, very near the place where Belalcazar crossed the river. Up this all the material, including three 40-ton locomotives and six locomotives of smaller size, was hauled by mules, the railway built and the cart-road allowed to fall into disuse. The cost of the railway is given



Typical gateway, with usual type of mud wall on right and with the less common wall of adobe brick on the left



On the Soacha road—looking across the Sabana to the range just behind Bogotá

ON THE SABANA

as approximately £300,000 (\$1,500,000), or £12,000 per mile, and it is now the property of the Government. There are many villages in the plain, and the train makes frequent halts. A quarter of the way to Bogotá is Madrid, the centre of a population of 4,000; half-way is Mosquera, the station for the nearby Funza, which is a town of 3,000 to 4,000 people, at one time the capital of the Department of Cundinamarca, and for a time considered by historians to be the site of the ancient capital of the Zipas. Beyond we crossed the Rio Funza, and six miles from Bogotá reached Fontibón, which has now been proven to have been the site of the Zipa capital of Bocotá. From here there is a very clear view of the principal city of Colombia, built on the lower slopes of the low range which marks the eastern edge of the Sabana, and whose bare rugged summits rise 2,000 feet above the city in the Cerro Guadalupe and the Cerro Monserrate, each crowned with a chapel.

The train hurried along through the fields and the groves of eucalyptus, and at half-past five on the afternoon of the 13th of August, having taken just ten and a half hours by train to cover 107 miles, we pulled into Bogotá and received a welcome from the warm-hearted friends assembled at the station, among them the gifted representative of our firm, Mr. Martin G. Ribon, himself a Colombian by birth but an Englishman and Frenchman by training. Mr. Sladden, who followed the usual route from Quito, reached Bogotá only five days ahead of us, and a special inquiry is being held to determine who won the wagers on the quickest trip from Quito to Bogotá, the contention being that had we not made the side-trip to Buenaventura, we would have arrived first!

The journey from Quito to Bogotá is completed. Starting from the first Spanish settlement in Ecuador, and always its chief city, the ancient capital of the Quitos and one of the centres of Inca civilisation, we have come across mountains and valleys to the chief city of Colombia, located near one of the capitals of the old Chibcha civilisation, and, while not the first Spanish settlement in Colombia, the one which, at an early date, became the most important. There are many points of resemblance between the two capitals and some features in which they differ; both are in mountain-parks on the top of the Andes, where there is a cold temperate climate; both are high above sea-level—Quito a few hundred feet more than 9,000, and Bogotá an almost equal amount less; both have until recent years been difficult of access, and both are among the old centres of civilization, both Indian and Spanish, of South America. Quito is the older of the two by four years, and though it is to-day a town of only 80,000 people, whereas Bogotá is half again as large, its Government and Church buildings are more impressive and more beautiful. The location of Quito is more picturesque; its neighbouring mountains are more impressive, and its immediate surroundings more diversified. Bogotá, on the lower slopes of a ridge which rises 2,000 feet above it and extends in a straight line north and south, looks out over a great level plain, fertile and valuable, but rather monotonous; one must journey away from the city to get the beauty even of the ridge which lies behind it, and must go even farther to appreciate the rugged mountain scenery and waterfalls which lie on the sides of the Andes beyond the rim of the park, both to the east and west. Quito is built on the undulating surface of

a little valley in the mountains, and in every direction there is a differing landscape.

In Bogotá more attention is devoted to arts and letters. One is not a little surprised to find on entering a drawing-room that, in addition to speaking perfect Spanish, everyone, as a matter of course, speaks French, and that half of the gathering, including many who have not been away from Colombia, speak excellent English. The charm of the culture of Bogotá and the courtesy of her well-dressed people grows upon you, and there is no little ground for the proud claim that Bogotá is the "Athens of South America."

SEVEN

AROUND BOGOTÁ

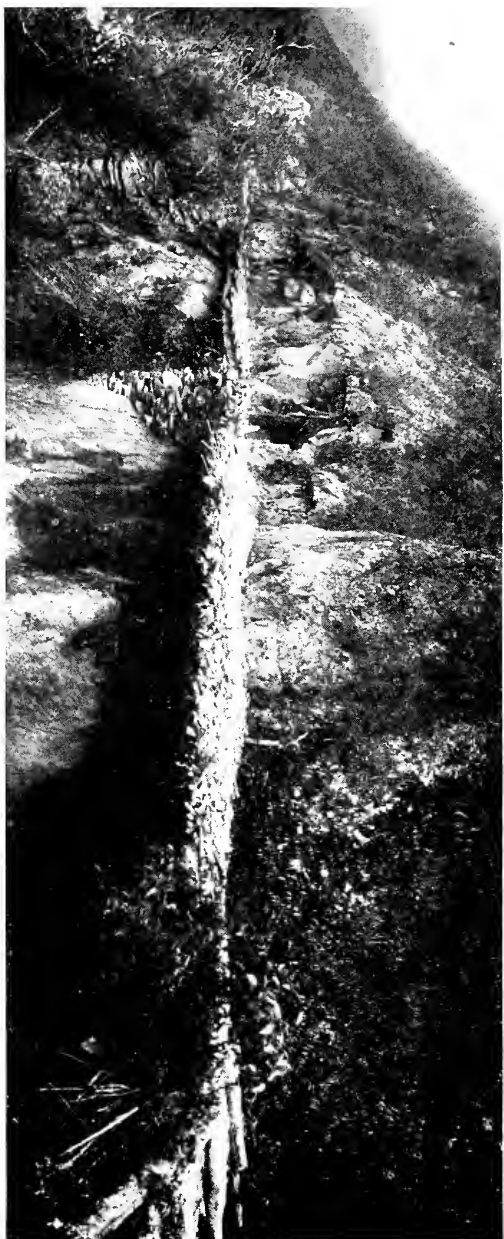
*Bogotá,
Carrera Nueva No. 213,*

23rd November, 1913.

BOGOTÁ was founded by Gonzalo Jiménez de Quesada on the 6th of August, 1538, after he had been nineteen months in the land of the Chibchas, which, with its cultivated fields, its houses and villages, seemed so fair a sight to him, after his hardships in the tropical forests of the Magdalena, that he called it "El Valle de Alcazares"—the Valley of Palaces. During these nineteen months Quesada and his followers had carried fire and sword virtually from one end of Chibcha-land to the other—166 men with 59 horses had conquered a population estimated by Acosta at 1,200,000 souls, and had secured all the more accessible stores of gold and emeralds. Satisfied, Quesada decided to found a capital city, and within this newly acquired territory he chose a site seven miles from the former capital of the Zipas, on the foothills of the eastern boundary of the Sabana, where there was a clear little mountain stream and where the Zipas had had a pleasure house and garden called Teusaquillo. Here Quesada erected a church and twelve houses, in honour of the Twelve Apostles, and, the first Mass having been said in the church on the 6th of August, 1538, he marched his little band of soldiers thrice around the place and solemnly declared it a city dedicated to the service of the King. The great plain reminded him of the Vega of Granada where he had spent his boyhood days, and he

named the city Santa Fé in memory of the great camp which Ferdinand and Isabel maintained in their wars with the Moors. At first only the name of Santa Fé seems to have been used, but very soon a suffix, descriptive of the locality of the new city, was added. The whole of the plain of the Sabana was called Bocatá by the Chibchas; the ancient capital of the Zipas bore the same name, and the new Spanish city thus naturally became "Santa Fé de Bogotá," which was retained officially during the time of the Spanish rule. When the country became a Republic the first part of the name was dropped and the town has since been called only by the Chibcha word which is said to signify, in that language, "the great cultivated land," a description which, applied to the Sabana, is singularly appropriate.

There is to-day along the very eastern edge of the city a beautiful carriage drive, the Paso Bolívar. Well laid out from a scenic standpoint, it is one of a number of things which in recent years the progressive people of the capital have done towards the beautification of their city. Starting from the pretty Park of Independence on the western edge of the town, it ascends gradually along the lower slopes of the Cerro Monserrate, then, crossing the clear mountain stream of San Francisco, which, with picturesque little waterfalls, comes through a break in the range between Monserrate and Guadalupe, it continues along the lower slopes of the latter peak to the old chapel of Egipto. All of the city lies below this boulevard; behind are mountain slopes, not so steep but that we expect to see them some day covered with beautiful residences and grounds. Below, the city slopes away to the edge of the plain at such a



AN ANDEAN TRAIL

On the road to San Vicente, 150 miles southeast of Bogotá

Photo by Mr. Mistrail

gradient that when it rains the water rushes down the streets and serves an important purpose in a town where there is no general sewage system. The impression of the city from the Paso Bolívar is of a sea of white straight-walled buildings, with red-tiled roofs, of the usual type of Spanish-American architecture, with its characteristic accompaniment of domes and dome-capped towers on the churches and houses of the religious orders. Most prominent are the twin towers of the Cathedral and the domes of San Domingo and San Ignacio.

Driving along the main streets of the city, however, one sees many relatively new buildings with a decided French aspect in their design. Among these the most notable are the new Presidential Palace, the Theatre, and the Engineering School, while the interiors and furnishings in the better houses are almost all pronouncedly French. The plain exteriors of the majority of the residences of the better classes hide beautiful interiors where one meets highly cultivated and gracious people. The still unfinished Capitol, which, like the Cathedral, faces the principal plaza, is of a type quite different from the other buildings, and with its great Ionic pillars and simple stone construction suggests an old Greek temple. Designed by the American architect Reed, its construction was begun in 1848 under President Mosquera, whose statue has very fittingly been placed in the outer court. The English-speaking visitor will be particularly interested in the marble slab affixed to the front of this building, which reads: "Colombia to the noble Venezuelans and the British Legion." Dr. Hiram Bingham, Professor of Latin-American History in Yale University, who in 1906 and 1907 personally followed

the route of Bolívar's celebrated march, in 1819, to the battlefield of Boyacá (10 miles south of Tunja), which conflict resulted in the final overthrow of the Spanish power in Colombia, records that more than half of the men who made the extraordinary march from the banks of the Apure to Boyacá over a route the Spaniards considered impassable were Bolívar's faithful Allies, the soldiers of the British Legion, and that it was this Legion which made the bold frontal attack which, combined with the flank attacks of the remaining troops, caused the complete rout of the Spanish Army. He adds: "Colombia has acknowledged the debt she owes that brave regiment by placing its name in a prominent position on the monument that has been erected near the bridge of Boyacá"; and the part played in the Wars of the Independence by the British Legion, composed mostly of Scots and Irish, has again been gracefully recognised by this tablet affixed on the Capitol in 1910, the centenary of the beginning of Colombia's struggle for freedom.

It is quite indicative of the studious character of the people in Bogotá that I found Professor Bingham's journal of his expedition across Venezuela and Colombia, as well as a host of other books, printed in English, kept in stock in the principal book-store of the city, belonging to Messrs. Camacho Roldan and Tomayo. I also secured here a copy of Colonel Hamilton's "Travels Through the Interior Provinces of Colombia," published in London in 1827, which, the proprietor told me, he had purchased in a second-hand book shop in London on his last visit to Europe, because of the demand in Colombia for such works.

Among the architectural features of Bogotá one is most

of all attracted by the beauty of the cloisters in the old convent of San Domingo; this, like many other buildings of a similar origin throughout the Republic, is occupied by Government Offices. To-day it contains the Post and Telegraph Offices, and the Ministries of the Treasury, Interior, and Public Works. Other notable cloisters are to be found in San Bartolomé, still a Jesuit School, but these are inferior in beauty to those of San Domingo. In the churches are many works of art—wood carvings, paintings in quaint frames and jewelled monstrances with wonderful emeralds. We visited again and again the series of great carved cedar altars in the Church of La Tercera.

Throughout the town are a number of noteworthy statues, many of them erected during the celebration of the Centenary in 1910. One of these, a very noble and dignified statue of the scientist and patriot, Caldas, is in the Plazuela Las Nieves, on the principal thoroughfare of the city and toward the Park of Independence. It is a grave and thoughtful figure; in the left hand he holds a manuscript, while the other is raised towards his chin in the attitude of a man lost in thoughtful meditation, but the irreverent street urchin, because of the position of the hand, refers to it as the statue of "Oh! I've swallowed my collar button." On the street leading to the railway station is a heroic figure of Nariño; the right hand is outstretched, the left has caught his great military overcoat and pulled it to one side in a strong oratorical gesture. It is a well-conceived and well-executed figure, but to the irrepressible gamin this is the statue of "Oh! who has stolen my pocket book?"

During our first stay in Bogotá, from the beginning of

February to the 1st of May of the present year, we saw that portion of the country nearby which could be reached by carriage or automobile. This is really limited to two roads, one the excellent Carretera Central del Norte, extending along the western side of the Sabana and completed well through the next mountain-park of Tunja. The only other road which offers any attractions for motoring is the one which runs along the south side of the Sabana to Soacha and Sibaté, with a branch extending to the Falls of Tequendama from about midway between these last two places—a total distance from Bogotá to the Falls of twenty miles. This “West Road,” as we commonly called it, though it is officially known as the Carretera de Soacha, can hardly be described as excellent in condition, but it is still passable for motors in dry weather, as we demonstrated in February last near the end of the dry season. It follows closely the Southern Railway (Ferrocarril del Sur), which extends the nineteen miles from Bogotá to Sibaté, and, like the Sabana Railway, was built before the completion of the Girardot line. The branch cart-road to Tequendama (five miles) is in much better condition because of the important hauling along it. The coal mines near the Falls furnish the fuel used on the Southern Railway, as well as part of that consumed in the capital city, and the output is hauled along this cart-road to the railway. It is also important that it be kept in good condition in order that the supplies needed for the hydro-electric plant, established on little rapids just above the Falls, may be brought in from the railway. Later we saw this magnificent waterfall on several occasions from horseback, and a



As seen from the road to Fusagasugá



The drop of the Rio Funza or Bogotá over the escarpment at the
Falls of Tequendama

THE WESTERN ESCARPMENT OF THE BOGOTÁ TABLELAND

detailed description may well await the narrative of these rides.

In our drives along this road we were struck with the great mud walls with Moorish gateways which surround the fields. These are the commonest sort of fence in a large part of the Sabana. They are usually three to four feet high, about a foot thick, and are constructed by pounding thick mud between a support of planks which are afterwards removed and used in building the next section. At the base a layer of stones is placed to facilitate drainage. The top of the completed wall is sometimes protected with tiles, but very often it is quite bare, and the fact that these peculiar fences last for years exposed to the wind and weather is a suggestion not only of the character of some of the Sabana soils, but also an indication that we are here out of the region of tropical rains. Each contribution of mud is somewhat irregular, and when the surface of the wall is etched by the winds and the rains the appearance is one which a geologist would at once describe as "cross-bedded." More rarely the walls are built of adobe or sun-dried brick. Every opening, even between interior fields, is spanned by a massive Moresque gateway, and these great, square-pillared, red-tile, flat-topped entrances are the dominating feature of the landscape of the Sabana.

Our favourite carriage drive now, as well as during our former visit, is along this Soacha road as far as the picturesque, quaint, old three-arch Spanish bridge over the River Tunjuelo, five miles west of the city. On the pillars at either end is still legible the inscription recording its construction in 1567. Here we had many picnic luncheons in the first months of the year, and now, whenever there

is not time for a horseback ride away from the Sabana, the choice is almost always a drive to the Tunjuelo bridge. From here there is a good view of the mountains behind Bogotá, and one of the series of mental pictures we shall long cherish is that of these mountains on our drives back to the city, particularly in the changing lights of the setting sun, with billowy masses of paramo clouds hanging over their summits. It is the most beautiful picture to be enjoyed within a few miles of Bogotá, unless one has a saddle-animal and is prepared to ride.

Two miles down the river from this bridge is the little village of Bosa, the site of a Chibcha village of the same name, which was the camp of Quesada in the months immediately preceding the foundation of the Spanish city of Bogotá. Quesada's headquarters had in the early months of 1538 been at Muequetá, or Bocatá, the capital city of the Zipas, and it was from there that the expedition set out which surprised the Zipa, Tisquesusa, at Facatativá, in which struggle the Zipa was mortally wounded. The legal heir, Zaquasazipa, had shown himself a weakling, and another nephew—Zajipa—was chosen to succeed, thus repeating in a measure the succession tangle of Atahualpa and Huascar, which helped the Spaniards in the conquest of Peru. Zajipa proved a brave and able leader and his persistent attacks forced Quesada to abandon Bocatá and retreat to Bosa, where the ground was more favourable for cavalry manœuvres.

The fierce Panches of the western slopes of the mountains, taking advantage of the disturbed state of affairs, made raids into the Chibcha country, and Zajipa committed the fatal error of visiting Quesada at Bosa with presents

of gold and emeralds and proposing that they together subdue the Panches. The Spaniards readily agreed; the joint expedition was successful, then there occurred the one act in the life of Quesada which constitutes, as Markham justly points out, an indelible stain on the memory of "this able administrator and born leader of men—dignified and resigned in adversity, ever loyal and zealous, ever ready to serve his country." Markham considers Quesada greater than Pizarro and greater, in some respects, than Cortes. After the successful completion of the Panche expedition, the brave Zipa, the ally and companion-in-arms of the Spaniards, was first loaded with chains and then tortured to reveal the whereabouts of the treasures the preceding Zipa was supposed to have hidden. At length he died in terrible agony—so perished the last of the Zipas, a sacrifice by Quesada to the demands of his followers.

Our other motor journeys around Bogotá were along the North Road—"Carretera Central del Norte"—which has now been completed a distance of 170 miles, and is the longest and the most important cart-road in the Republic. It runs through the relatively well-populated, fertile mountain-parks of the Eastern Andes, almost from one end of the ancient land of the Chibchas to the other. Its present state of completion is largely due to the energy and progressive spirit of President Rafael Reyes, and extending from Bogotá 71 miles through Cundinamarca, and passing his birthplace at Santa Rosa, in the Department of Boyacá, the road almost reaches the northern limit of that Department.

Of course, parts of the road are of much more ancient construction, and one of the interesting features of a car-

riage drive to the north of Bogotá is the circular enlargement, near the Polo grounds, that was constructed to permit the State carriage of the Viceroy to turn around. These grounds of the Polo Club in the northern outskirts of the city are quite an important centre in the social life of the capital. The people are fond of sports, polo, racing, foot-ball and cricket, and scarcely a Sunday passes without some gathering here. The French influence is so markedly evident in the dress and costumes at these meetings that the suggestion is of a portion of a well-dressed Longchamps gathering. Occasionally there is a bull-fight, but this national sport of Spain does not have a very enthusiastic support among the people of the capital, and those held in recent years are described as generally only amusing farces. There are annual agricultural shows at which are exhibited the fine cattle, Durhams, Holstein-Frieslands, Herefords and South Devons, which have been imported by the progressive people of the Sabana for the improvement of the local stock.

Beyond the Polo grounds is Chapinero, a rather recently constructed suburb of Bogotá, and here the road turns into the low foothills of the range at a slight elevation above the plain. The site of the old cart-road in this part of the Sabana is now occupied, as far as the Puente del Común, by the Ferrocarril del Norte which, like the other Sabana railways, was equipped with locomotives and cars brought up the sides of the mountain by mule-power, but, unlike them, it is still privately owned. It was built on a Government subvention which is estimated to have fully covered the cost of construction and made of the railway a free gift from a generous Government to the energetic builders.

The cart-road of the north is said to be a good motor-road for its entire length, and during our earlier visit a much discussed plan was to motor to the old city of Tunja, formerly the capital of the Zaque, or King of the Northern Chibchas, and to-day the capital of the Department of Boyacá. After Bogotá, Tunja is the oldest Spanish city in the Kingdom of New Granada; it is only 100 miles from the capital, but the condition of the road precludes making the round trip in a day. The farthest north we reached by motor was the hill just to the east of Suesca, a distance of 40 miles. Here the extension of the Sabana along the Rio Funza is so narrow that it is to be described as a flat-bottom stream valley, and the road builders have found it expedient to cross a hill-point rather than follow the main valley. The little village of Suesca, which lies in the valley to the west of the main road, is very closely connected with the events of the Conquest. Here there was a rich and important Chibcha city, called "Suesusa," which word is said to signify "The Hill of the Macaw," because of the variety of colours of the plain, in the midst of which there is a hill of peculiar form. This city, while acknowledging the kingship of the Zipa of Bocatá, is said to have been a free city similar to the German Hanseatic towns, a place of refuge for the proscribed and persecuted. It was here in the early months of 1537 that Quesada, coming from the north, first entered the Sabana, and it was the messenger sent from the chief of this place that brought the news of the arrival of the Spaniards, with their terrible, strange animals, to the Zipa in his council chamber at Bocatá. It was to Suesca that the Spaniards retreated and established a defensive camp in the last months of 1537,

after their raid and pillage of Tunja, the capital city of the Zaques, and the destruction of the temple and seat of the religious chief of the Chibchas at Suamo (Sogamoso), just to the east of Tunja. It was here at Suesca that Quesada, after his return from ten years of misrepresentation and persecution in Spain, the first reward of his perseverance and leadership, wrote three books on the Chibchas and their history under the title of "Los Tres Ratos de Suesca," that is to say: "The Three Holidays at Suesca," because they were written during three visits to his farm near this place. As Quesada was a man of education and literary ability, an advocate in the High Court of Justice at Grenada before he came to America, this is probably the most important and accurate account of the Chibchas which has been written. This treatise was never published, and has disappeared; one can only hope it has not been actually destroyed and will some day come to light, like that important manuscript on "The History of the Incas," by Sarmiento, which was discovered only in 1906 in the Library of the University of Göttingen, where it had lain forgotten for generations, and the other account of the Incas by Don Felipe Huaman Poma de Ayala, wonderfully illustrated, which was only unearthed in the Royal Library at Copenhagen even more recently. The romance of the loss and recovery of these old documents is quite in keeping with the matters of which they treat.

Returning from Suesca toward Bogotá, we pass, near the village of Sesquilé, the opening of the flat-bottom valley of the Siecha, a tributary of the Funza. In this valley, nine miles to the south, lies Guatavita, and near it to the east, in the top of the adjoining range, is the little



A HACIENDA ENTRANCE GATE
View from the house at Las Palmas

lake of the same name, where, in the days of the Chibchas, the annual ceremony was performed that gave rise to the story of El Dorado ("The Gilded One"). It was this powerful lodestone that drew three expeditions to these upland parks of the Eastern Andes across unknown wilds and through untold hardships. It is one of the strangest coincidences of history that three expeditions should set out independently from widely separated points into an unknown wilderness—one from the northern coast of Colombia under Quesada, one from the coast of Venezuela under the German, Federmann, and the other from Quito under Belalcazar—all in search of "The Gilded One"—and should meet on the Sabana of Bogotá not far from the place where the famous ceremony was performed which was the basis of these far-flung rumours.

In this ceremony, which was of a religious character, the Usque of Guatavita, his body anointed with grease and powdered with gold dust, was solemnly conveyed to the centre of the lake on a raft, where, at an appointed signal, he dived into the water and the populace on the shore threw into it the offerings they had brought. Many attempts have been made to drain the lake and recover the gold, but the metal secured has in the aggregate been rather less than the money spent in these efforts.

Though actually having found the home of El Dorado, the reality was so small compared with the fantastic stories which had been evolved from this simple fact, the Spaniards felt that they had not succeeded and must seek further. The brother of Quesada, who was placed in charge of New Granada when the leader returned to Spain to present his discoveries and claims to the Throne, made the first at-

tempt, performing a terrible journey, in 1541-1542, through the plains east of the Central Andes, and only reached Pasto after frightful suffering and the death of most of his followers. Even the great Quesada himself, the first explorer to reach the real home of El Dorado, continued the search when he was three-score years and ten, for in 1569 this old warrior equipped an expedition at a cost of \$300,000 gold, and marched south and east from Bogotá with 300 Spaniards and 1,500 native porters. Only twenty men remained with the leader when he reached the Guaviare, near its junction with the Orinoco, and he returned to Bogotá after an absence of two years, an old man of 72, heavily in debt. The greater part of the life of this wonderful man was spent in seeking for one thing and, like many another, when he found what he sought he did not recognise it.

Along the Carretera Central del Norte there are a number of small villages, but none of special importance in the 40 miles which we traversed. From Tocancipá, 25 miles from Bogotá, there is a branch road, not passable by motor, leading westward across the Funza to Zipaquirá, which lies eight miles away at the eastern foot of one of the finger ridges of the Sabana. It is an important place and is one of the ten municipios in Cundinamarca, not including Bogotá, which have a population approximating 10,000 people. Here there are large deposits of rock salt estimated to contain a billion tons; these deposits, together with those at Nemocón, seven miles to the northeast along the Rio Tibitó, were the principal source of the wealth of the Chibchas, in whose ancient Kingdom there were no deposits of gold of importance and whose land was too

cold for the growing of cotton, yet the Spaniards found these people dressed in cotton cloth woven by themselves from supplies obtained from their neighbours and with an abundance of ornaments, vessels and utensils of gold, and alloys of gold. Like some of the modern nations which are without appreciable deposits of gold in their own home countries, they became a great storehouse of gold secured through their ability as traders, and the keystone of this trade was salt. There were small deposits of emeralds within the Chibcha-land, but the greater portion of their store of these gems came by trade from the less civilised Indians about Muzo, and here again the principal purchasing power was the very precious salt.

Nearer Bogotá and only 18 miles north of it, the Northern Cart-Road touches the Rio Funza, where there is an important bridge, the Puente del Común, across which the main thoroughfare from Bogotá to Zipaquirá passes. It is an imposing stone structure, built by order of the Viceroy in 1792. There is a current story that it was constructed by British prisoners captured in Admiral Vernon's unsuccessful attempt on Cartagena. However, as this attack occurred in 1741, these prisoners could hardly have rendered effectual service in its construction. Two or three miles to the west is Chia on the site of the important Chibcha town of that name, where in 1537 the first Easter Service was held in the Kingdom of New Granada. Beyond is the ridge which separates the second and third fingers of the Sabana, and it was to a house on this ridge that the heir-apparent of the Zipa was taken at the age of sixteen. Here he was kept in seclusion and received the training which would fit him for his high office.

The heir of the Zipa was not the son or daughter of the sovereign, but his nephew, the eldest son of his sister. Beyond this ridge and near the very tip of the second finger of the Sabana, is Tabio, where the Zipas had a country house with gardens and thermal baths.

There are thus many points of interest in the environs of the capital which one can visit in a carriage or motor, but the more beautiful surrounding country is not accessible in either of these ways. To one with a good saddle animal there are almost endless opportunities, and having our tried animals of the trip from Quito, we have, during the present stay, quite forsaken the North and West roads, except for short drives. On the first day out from Quito, Lord Murray was disturbed by the occasional narrowness of the trail and the depths to which some of the mountain valleys yawned below. He had not learned the full amount of trust that could be placed in the sagacity of the mountain mules and horses, and in places where the trail was very steep he felt he would be safer on his own feet. While we were walking down one such place he wondered if he would ever grow accustomed to such heights and such trails, and the reply, which he refused to credit, was that before he completed his overland journey he would have become so accustomed to heights and so sure of his trail-wise animal that he would ride over the mountains about the capital city for the mere pleasure of riding.

Since our arrival here on the 13th of August we have spent every week-end, when the pressure of work permitted, in such rides. We have clambered down the sides of the Andes, both to the east and west, and on one of the mule-trails over which we passed oftenest, one paved with

stone in places, always slippery with moisture, and where the descent is so steep that the road is but a stone staircase, Lord Murray on his faithful Pasto horse covered the descent of 3,000 feet in so short a time, that he was told by the people of these mountains, who begin to ride on a saddle-animal almost before they can walk, that it constituted a record. In his enthusiasm over these rides, Lord Murray repeatedly urged a friend, who had ridden only in Europe, to accompany him, but the descriptions of the Colombian mountain-trails which he had received from others deterred him; finally he questioned one of our party, who, not appreciating that he desired detailed and specified information, told him that, "compared with the trails along which we passed in our journey from Quito, these week-end trips were like rides in Hyde Park." He then joined us, but was so terrified by the very steep descent that he found no pleasure in the trip and the climb back to Bogotá so added to the nervous strain that he vowed "Never again!"

Near Bogotá we have ridden to the tops of Monserrate and Guadalupe and along the ridges in either direction; to the west we have made repeated trips down the main mountain mass to Fusagasugá and through the Boca del Monte to Tambo and Tena, returning by way of the Falls of Tequendama; to the east we have made a number of trips on different roads across the mountain-top and down its side through Chipaque, Ubaque and Choachí to the valley of the Rio Blanco and Rio Negro, tributaries of the Orinoco. One of the results of these week-end journeys has been the determination of the structural characteristics of this portion of the Eastern Andes.

The impression which one gets in riding rapidly across the Central Andes is of a great wrinkle of the earth's surface in which, except for the material thrown out from the volcanoes, the older rocks form the centre and summit of the range and the younger beds follow on the flanks. Broadly speaking, along the Quindío road the suggestion is of an anticlinal mountain range. With this impression of the nature of the structure of the Central Andes, we were quite prepared to accept the diagrams given in some works, in which a similar structure is depicted for the Eastern Cordillera. These ranges are all young, in terms of geologic time, and this is the structure naturally to be expected under such conditions. We were therefore surprised to find that the broad top of the Andes at Bogotá is a synclinal mountain and that the stream erosion has carried away a vertical thickness of 20,000 feet of strata on both sides. The fossils collected indicate that this enormous thickness is probably all Cretaceous and that it is certainly all Mesozoic. The mountains are therefore geologically relatively young, but the extent of the erosion, within the time since these sediments have been elevated above sea-level by this enormous wrinkling, is quite an impressive fact. If all the sediments which have been worn away by the streams and carried out into the Llanos on the one hand, and into the valley of the Magdalena on the other, could be restored, there would be thirteen miles east of Bogotá and thirty miles west, twin mountain ranges 25,000 feet high, and the area which is to-day the broad top of the Eastern Andes would be the intervening valley, over 16,000 feet below their summits. The reconstructed fold of which the Cerro Monserrate and the Cerro Guadalupe



The paved way



Tree ferns near road

ON THE WAY TO FUSAGASUGÁ

represent the mere stumps, would be only a minor wrinkle in this great depression.

The features of this structure can be more clearly understood with the aid of the diagram placed at the end of this volume. The valley of the Rio Blanco, shown on the right side of the lowest cross-section, is on the axis of an anticline, and proceeding to the left successively higher and higher beds are encountered as we ascend the mountain. There is first 10,000 feet of black shales easily eroded, then a series of alternate sandstone and shale beds 2,000 feet thick which produce long hog-back ridges half way up the mountain slope, then 7,500 feet more of soft black shales and on the top of all a very massive series of sandstones, with some shale and limestone, 2,000 feet thick. It is this last series of resistant beds that is responsible for the preservation of the present crest of the Andes. They form on each side of the mountain-park of Bogotá great escarpments, very picturesque, but rather difficult of descent. The beautiful Falls of Tequendama are produced by the waters of the Rio Funza or Bogotá falling over this precipice on the western side of the upland. The range behind Bogotá, as shown on this diagram, represents but the stumps of a local fold which has brought up the upper sandstone layer, the other part of which is found in the Paramo of Cruz Verde. The distortion of this fold produces the singular effect noticed in Bogotá of the rocks in Monserrate appearing to slope to the east, while those of Guadalupe slope to the west.

In going to Fusagasugá we ride down to the railway station at Bogotá, first along the rather narrow streets which are characteristic of the older parts of the town—mostly

paved with cobble-stones, but some with well-laid Colombian asphalt from the neighbouring Departments—and then along the broad avenue which extends from the Plaza de Nariño to the station and beyond. Just before reaching the station we pass between two statues facing each other, one of Isabel the Catholic and the other of Columbus. Columbus is standing with his right arm outstretched as if saying, "See what I have discovered!" and it is one of those amusing chance happenings of large cities that his finger points towards a building on which there appears in large letters the words "American Bar."

At the station our saddle animals go with those of other travellers into the special car carried by all passenger trains about Bogotá, and in a little more than an hour, across the level floor of the Sabana, we reach the two-storied building bearing the name "Station Santa Isabel," which is the official railway name for the little settlement so long known as Sibaté that we did not find the new name in use except on the station building and the railway tickets. There is an early morning train to Sibaté which enables one to get into the saddle here before nine, and, if in a hurry, to reach Fusagasugá for luncheon. However, the beauty of the trail is such that one should not hurry over it and should carry a luncheon in his saddle pockets. On one of our first trips we went to Sibaté on the evening train and stopped at the "Posada," a building in the form of a hollow square surrounding a large garden patio where we were so well treated that we wished such posadas had been spaced at convenient intervals along the way from Quito.

However, if one does not mind an early start, it is rather more convenient to catch the morning train and make the

journey a continuous one. Sibaté is near the very end of the southwest prong of the Sabana and the railway station is at exactly the same elevation, 8,565 feet, as the one at Bogotá. The flat land is here about a mile wide and is bordered on either side by regular, rounded ranges of hills showing portions of the upper sandstones. The cart-road extends to the end of the flat land, about a mile south of the village, where begins the paved stone trail that extends for five miles over the rather level Paramo of San Fortunato, 9,400 feet, and then tumbles down the escarpment as a zigzag trail, often a veritable staircase, to the beautiful little Rio Barroblanco, and then proceeds along the foothills, a total distance of twenty miles to Fusagasugá, located about 4,000 feet below the bordering rim of the upland and 3,000 below Bogotá. The name Fusagasugá is said to signify in the language of the aborigines "the village at the foot of the mountain." Before it lies a sloping, semi-arid plain used for grazing, with here and there patches of irrigated land, shut in on each side by gradually descending spurs. Behind, the mountain is covered by forest growth broken by diminutive clearings and rain-shadow areas to an elevation of 10,000 feet.

So in leaving Sibaté we pass from the relatively treeless Sabana, with its bare bordering hills, into the low tree-growth of the so-called Paramo of San Fortunato, which is rather below the level of the real paramo vegetation, and the forest on it is sufficient, particularly towards its western side, to justify unimportant lumbering operations. Down the slope on the west side there are bits of real jungle-forest, almost to the level of the plain at 6,000 feet, and scattered through it from top to bottom are beautiful tree-

ferns. We have seen these growing in Colombia almost everywhere between elevations of 5,000 and 10,000 feet, wherever there is sufficient rainfall.

Along the trail on the mountain side are delicately feathered, vine-like, small-stemmed bamboos which drape some of the trees to heights of thirty or forty feet, and luxuriant growths of begonia covered with red blossoms. Near the little bridge are waterfalls in the Rio Barroblanco, and beyond, along the foothills portion of the road, we saw swarms and swarms of gloriously coloured butterflies. Near the village we entered the coffee plantations which constitute the most important industry of this locality. The coffee grown on these western slopes of the Bogotá upland is reputed to be the best produced in Colombia. The belt extends along the range near the lower edge of the tree-belt and above the semi-arid portion of the Magdalena Valley, at an elevation ranging from 4,000 to 6,000 feet. The coffee industry is of such importance here that the extension of the railway from Sibaté has been seriously discussed, but the traffic which might be reasonably expected does not appear sufficient to warrant the construction of so expensive a line, particularly as carts and mules still successfully compete with the Southern Railway from Sibaté to Bogotá. Most of the coffee of this district now goes over the bridle-road along which we have come. A cart-road is to be built on a route necessarily differing from that followed by the trail, and we saw the incomplete first section of it near the Barroblanco bridge; however, the maintenance of a cart-road through the rainfall belt is going to present many difficulties, judging from the depth and character of the mud into which we plunged on the



Bamboo clumps surrounding the bathing pool at Las Palmas



Las Palmas

À HACIENDA NEAR FUSAGASUGÁ



sides of the narrow paved trail, when it became necessary to pass cargo trains going in the other direction.

At Fusagasugá we stayed in the delightful hacienda "Las Palmas," a coffee plantation, and the property of Miss Cote, the proprietress of the hotel bearing her name in Bogotá. There are orange-trees, gardenias and camelias in the patio and along the entrance walk, and quite a collection of orchids. There is a stone-lined spring-fed bathing pool in a great screen of feathery bamboos approached by a walk from the house bordered by tree-ferns. It is a delightful change from Bogotá which, with a mean temperature of 55 degrees Fahrenheit, is pleasant on sunny days, but rather cold in the evening and in dull weather. As fuel is not readily obtained and fires not an absolute necessity, the houses are constructed without any fire-places, and many a time in Bogotá we have felt that a small open fire would be both cheering and comforting. Las Palmas, with a mean temperature of 68 degrees Fahrenheit, is just a happy mean between the sometimes too cold air of the capital and the unpleasant heat of Girardot. Miss Cote, although a Colombian, has lived so many years in the United States that she is spoken of in this manner rather than as "Señorita Cote," not only by the people of Bogotá, but by her manager and household staff at Las Palmas as well. Nowhere about Bogotá can the traveller find a more pleasant resting place.

The region of Fusagasugá was held by that portion of the Chibchas known as the Sutagaos. They and their ally, the Chief of Tibacui, were forced to acknowledge the rule of the Zipa of Bocatá in the century preceding the arrival of the Spaniards. Tisquesusa, the Zipa killed in the fight

with the Spaniards at Facatativá, in his youth led an expedition to chastise the rebellious Sutagaos, and in so doing constructed "a broad road from the Sabana to the Plain of Fusagasugá," apparently along the route now followed by the paved way. When Quesada reached Bocatá he was disappointed in the gold secured and sent an expedition to the West under San Martín, and another toward the South under Céspedes, which reached the plain of Fusagasugá in the summer of 1537 without much difficulty. San Martín, penetrating into the land of the Panches, was defeated not far from Juntas de Apulo, and forced to retreat across the intervening hills to Tibacui in the valley of Fusagasugá, where he was met by Céspedes. This combined force, together with the Guechas or Frontier Guard of the Zipa—for the Chibchas seemed ever ready to join the Spaniards against their ancient enemies—fought a great battle with the Panches in the hills to the north of Tibacui, but was defeated and again forced to retreat.

Tibacui lies eight miles west of Fusagasugá, and during one of our week-ends at Las Palmas we rode over the plain, crossed the trench which the Rio Panche has cut into its surface, and climbed to Tibacui (6,200 feet), perched on the side of the ridge which separates this village from Tocaima and Juntas in the valley of the Rio Bogotá. We were accompanied by the curé of Fusagasugá, and were most hospitably received by his brother, who is the priest of Tibacui, and conducted to the large "Carved Rock" on which, among a number of chiseled pictures, the most notable is a coiled serpent.

From this trail one has a comprehensive view of the treeless plain of Fusagasugá, a gigantic alluvial-fan of gentle

gradient, originating primarily in the low gap just to the south of Fusagasugá, through which the Rio Cuja passes. This stream has now abandoned the apex of the cone leading directly to the Panche, and, flowing to one side, parallels the Panche for ten miles. There are indications that this plain is, in part at least, glacial outwash. Tibacui appears a town of a few hundred people and is, according to the 1912 census, the centre of a municipio of almost 4,000, while Fusagasugá, a town of a few thousand, is the centre of a population of 13,443. The statement is sometimes made that Belalcazar passed through Fusagasugá on his journey from Popayán to Chibcha-land, but this seems to rest on no other foundation than that this is the most direct way. On the other hand, it is well established that Belalcazar followed the west bank of the Magdalena to a point fifty miles north of Girardot, and that only there did he learn the exact position of the Sabana, which he approached from this point by way of Tena.

The return to Bogotá is over the same route, and as there is an evening train leaving Sibaté at five o'clock and reaching the capital in time for dinner, it is easy to have an early luncheon and make a comfortable journey. The most attractive short ride at Bogotá is to the dear old church built on the top of Monserrate in 1620. There is a well-constructed trail, very steep in places, cut into the face of the mountain, and this path is often thronged with people going to the church, in which is a much-revered figure of Christ called the "Monseignor of Monserrate." In certain of the great religious parades this is carried down the side of the mountain and is believed by many of the Indians to be particularly efficacious in bringing rain after a long

period of drought. The church is just 2,000 feet above the railway station, and the surrounding elevations are covered with wild flowers of the paramo vegetation at certain seasons of the year. From this commanding point the view of the city, the Sabana, the low bordering rim and the distant snow-peaks of the Central Andes, is most satisfying.

Another ride which we made several times was down the western side of the upland to the now virtually abandoned inn of El Tambo, half-way between the Sabana and La Mesa, and on the old paved road that, during the many years occupied in the construction of the Girardot railway, was indeed a very busy thoroughfare. Then El Tambo was an important hotel, large and well-kept, now it is without guests except occasional arrieros and almost all of its furnishings have been removed. We therefore found it necessary to carry our cots and bedding on every trip. Indeed it was the better equipment at Las Palmas that caused us to make more frequent journeys there, than to El Tambo, where the great western veranda seems built to give a perfect picture of the distant Tolima, one of the most beautiful panoramas in this country of magnificent views.

"Tambo" is one of the words which the Spanish language has borrowed from the Quichua. It is related by the chroniclers that in constructing their great highways the Incas caused to be erected at intervals of a short day's journey, that is twelve and a half miles, inns for travellers called "tampus" or "tambos." These were buildings of importance designed also to afford resting places for the Inca himself in his journeys about his Kingdom, and to serve as provision store-houses for his army. It is related by

Cieza de Leon that "when the lord of Cuzco set out, the march was regulated each day from *tambo* to *tambo* where sufficient food was found for all," and that "the lieutenants and other overseers who resided at the chief stations in the provinces took special care that the natives kept these *tambos* well provisioned." And so we find on the Eastern Andes, hundreds of miles from the land of the Incas, an inn of comparatively recent construction, situated at a point a day's journey from La Mesa on the one hand, and Madrid on the other, most appropriately bearing the old Quichua name of "tambo," just as we find other stopping places called "El Tambo"—some doing poor honour to the name—scattered over much of the northern and western part of South America, and in some places towns of the same name, which have evolved from such stopping places.

In going to El Tambo one takes the Sabana railway to Madrid, a little town almost midway between Bogotá and Facatativá. Here, if the traveller has made due preparation for the journey, there are two or three cargo-animals waiting to take the luggage he has brought with him, but if, as sometimes happens, there has not been ample time to prepare for the journey, it is generally possible to find a cargo-train which has brought produce to the railway and is returning down the trail. On one occasion we reached Madrid without previous arrangement and found a man ready to contract to carry our equipment. It was loaded into a wagon, which went over the six miles of road to Barroblanco, a little settlement in the low bordering hills near the western escarpment. Here he expected to find pack-mules which had brought cargoes up the mountain to be hauled by cart from this point to the railway. We

waited a bit, but finally accepting his assurance that he would deliver our cots and bedding at Tambo before night-fall, went on our way. They finally appeared at two o'clock in the morning on the backs of four great white oxen.

Immediately beyond Barroblanco we reached the edge of the escarpment at a point called "Boca del Monte"—mouth of the mountain. This is 8,560 feet above sea-level and about 100 feet above the railway station at Bogotá. It is, therefore, somewhat lower than the greater part of the capital city, but it seems much colder—the winds whistle through the gap and there is generally a moist paramo cloud, caught on the edge of the upland, through which one must pass. The drop over the escarpment into a jungle forest is along a stone staircase, rather wider than the one leading to Fusagasugá, and showing much engineering skill in the solution of a difficult problem.

Soon we reached the few houses called Tenasuca, which occupy the site and grounds of one of the three country residences of the Zipas. El Tambo lies about a mile beyond, and only three miles from Barroblanco, but in this distance the descent is almost 3,000 feet. El Tambo, though at virtually the same elevation as Las Palmas, is thus nearer the railway and more accessible. It commands a far more beautiful view, and has the same agreeable temperature. Behind the house is a natural rock-bottom bathing pool in a pretty little mountain stream, which a short distance below forms a series of cascades in a narrow gorge in the black shales, here crowded with fossils. Higher up is a tiny hydro-electric plant, which, in the days when this was a much used road, furnished electric light for the hotel.



Paved road and Fusagasugá plain



Coffee plantation of Las Palmas, showing low-trimmed
coffee bushes and large shade-trees

ENVIRONS OF FUSAGASUGÁ

On the very top of the mountain spur, overlooking El Tambo on the north, is the small glacial lake of Pedro Palo at the foot of the sandstone escarpment and at an elevation of 6,600 feet. At a number of points through the Andes we saw deposits which appeared to be of glacial origin, but here there is conclusive evidence of glacial action and large well-marked moraines. It is in this region that rumour says the stores of gold belonging to the Zipa, Tesquesusa, were hidden at the time of the conquest, but though many have searched for this treasure, none have found it.

The return to Bogotá from El Tambo can easily be made by way of the Falls of Tequendama, and thence to the Southern Railway at the station between Sibaté and Soacha. On this route, instead of returning east, we proceed along the same road to the west, almost to Tena, 4,425 feet, and then, turning to the left, follow a side road towards San Antonio. Tena was one of the towns on the western frontier of the Kingdom of the Zipa of Bocatá, and Belalcazar marched on this place from his camp on the Magdalena, fifty miles north of Girardot. Belalcazar had been interviewed at the Magdalena by Quesada's brother regarding his intentions, and had given satisfactory assurances. However, a little later he heard of the approach of a rival expedition under Federmann, and knowing also of the diminution of Quesada's followers through their conflicts with the Indians, he thought he could successfully intervene, but he found the town already held by Quesada, and allowed his forces to join the troops of this leader without any payment such as was made to the German, on the agreement that a settlement should be established at Neiva, which, with the upper

Magdalena Valley, should be considered as belonging to the Province of Popayán, and that the two leaders should journey together to Spain to present their respective claims to the King. It was along the very route that we have followed that Belalcazar first entered the Sabana.

Tena and San Antonio (6,330 feet) are both just below the heavy tree belt, and in going from one to the other we pass along the mountain slopes well above the Rio Bogotá. San Antonio, on a hill point overlooking the stream, is a place of a few hundred people with an old stone church, and is the centre of a Municipio of 4,400 inhabitants. Leaving San Antonio for the Falls, we descend after a little time into the trench which the river has cut into the hummocky glacial debris that tends to mask the really broad and mature character of the valley. The stream here is a raging torrent, filled with great boulders, and we cross it on a new bridge, which uses one of the boulders as a central pier.

We turn eastward along this almost treeless valley, up and down over the irregular glacial deposits, and in about three miles reach the foot of a tree-covered escarpment up which we climb on a zigzag trail that finally reaches the summit of a horizontal ledge of sandstone, along which it proceeds at an easy gradient. The trail turns the point of a hill, and there appears before us a perpendicular-sided, amphitheatre-like abyss at the head of which are the Falls of Tequendama, one of the beauties of the upland of Bogotá, of which every Colombian is justly proud. The crest of the Falls is approximately 8,200 feet above the sea, and its height, according to Dr. Alberto Borda Tanco, Dean of the Faculty of Mathematics and Engineering in Bogotá, is 443 feet. Forest-covered hills slope to the edge

of the rock-walled gorge, and along its floor may be seen the feathery tops of palms recalling the warmer regions from which we have just come. The jungle along the floor, resulting from the mist from the Falls, is very dense, as anyone who has tried to penetrate it will testify.

This Falls has an origin similar to that of the famous Niagara. In both cases a river flowed through a channel lying to the north of its present one, and when this old valley was filled with debris by glaciers and the river forced to take a new course it was precipitated over an escarpment—in one case over that formed by the Niagara limestone on the shores of Lake Ontario, and in the other that formed by the upper sandstones around the upland of Bogotá. The Falls of Tequendama began at the edge of the escarpment up which we climbed from the broad valley below, and it has in its lifetime cut the gorge from this edge to its present site. The recession in the case of Niagara is something like seven miles; that at Tequendama is less than half a mile. The length of time which has been required for Niagara to cut its gorge of seven miles has been the subject of many studies and calculations, and the date at which the Falls started has been proven to be many thousand years ago, the mean of the calculations being about 30,000. In the case of Tequendama, where the height is roughly three times as great, but the volume of water available for cutting is infinitely less, no studies have been made, nor are there any maps which afford even an approximately reliable basis for establishing the average rate of recession and so computing its age, as has been done in the case of Niagara. The little evidence available seems rather to indicate that

the crest of Tequendama is very stable, and the rate of recession extremely slow.

There is a Chibcha legend which is worth considering in this connection, not so much because it gives any definite information, but rather because of the interesting speculations to which it gives rise. This legend is variously stated in different chronicles, but these all agree in the essential features—that in a former time the Sabana of Bogotá was well peopled, that it was then converted into a lake and the inhabitants forced to flee to the surrounding hills. They appealed to Bochica, who it would appear was a former ruler of these people under whom great progress had been made in the cultivation of the land and the development of weaving—so great were his benefactions that in time he became in the folklore of the people a demi-god residing in the sun, and the titular deity of the Usques or Chiefs. Bochica heard the call of his people and broke an opening in the hills in the region of Tequendama through which the waters of the lake drained, and there appeared again the Sabana of Bogotá, more fertile than before, where the people built new cities and again cultivated the land.

This legend rests on a solid basis of fact easily demonstrated, that there was a period in which there was a Sabana fit for the habitation of man followed by a period when the outlet was dammed by glacial action and the area converted into a lake, and that this was finally drained by the formation of the channel along which the Rio Funza or Bogotá now flows. Does this legend represent only a deduction, or is it a record of an occurrence actually witnessed by the ancestors of the Chibchas? I am inclined to favour the

latter hypothesis, and to regard it as placing the beginning of the Chibchas at a very remote date.

Near the Falls the trail we have been following enters the wagon-road which extends to the Southern Railway and the Carretera de Soacha. It was along this road that we came in a motor to the Falls in the early months of the year. At this time a table had been spread on the very edge of the gorge at a point which afforded a perfect view of Tequendama, and here was served such a wonderful repast that it required two great ox-carts to bring it from the home of our host Señor Tomás Samper. A short distance along the road brings us to the mines in the coalfield of Tequendama, occupying, like those at Zipacón, a little syncline in the upper sandstones. Beyond this the sandstones are folded up sharply and the road is blasted out of the rock cliff of the little defile through which the river passes. The other side of this small anticline in the upper sandstone is half a mile beyond, and here, over its hard layers, the river forms a cascade 147 feet high. Just above is a diversion dam, which forces the water into the 5-foot 3-inch supply pipe of the hydro-electric plant belonging to the Compañía de Energía located at its foot and three miles above the great Falls. This enterprise of the brothers José and Tomás Samper, established in 1900, is thoroughly modern in its equipment, and contains four turbines of a combined capacity of 4,500 horse-power connected directly with alternating dynamos. Operations are now under way for doubling the capacity of the plant, and a second supply pipe of similar size is partially completed, and four new turbines are being installed. The electricity is transmitted to Bogotá on overhead wires, carrying a voltage of 6,700

during the day and 20,000 during the night. Here at Charquito is a model school maintained by the Electric Company for the children of its employés, and a pretty little park of eucalyptus, plantations of which have also been made on the adjoining slopes to furnish a supply of timber. The company has been training a number of young Colombians at the plant, and Señor Samper states that these young men have shown such aptitude that the company now makes many of the parts and repairs in its own machine shop, which were formerly ordered from abroad.

Ascending the steep road of the hills above Charquito, we pass the diversion dam at the narrows, and are soon out on the Sabana. Here we see the construction work of the branch line of the Southern Railway, which will soon be in operation to the coal mines, and will thus give easy access to the hotel which it is planned to build above it. For a short visit such a hotel would be a convenience, but for a real vacation people will doubtless prefer to go to a place which is at a lower altitude and warmer. We catch the evening train for Bogotá at the small station on the Southern Railway called "The Falls of Tequendama" or "Puerta Grande"—"the Great Gateway"—and so complete the journey home from El Tambo by the longer route.

In riding over the hills of the Bogotá upland one cannot help but be impressed, as we were in the mountain-parks of Southern Colombia and Ecuador, with the great possibilities of the region for sheep raising. As in parts of Ecuador, a small quantity of wool is grown for home consumption and is woven into "ponchos," but when adequate rail communications are finally established we anticipate that sheep-breeding will become an important industry lead-



Monserrate—with, on the right at the foot of the mountain, a portion of Bogotá



On the road from Bogotá to Ubaque

MOUNTAIN TOPS NEAR BOGOTÁ

ing in time to the construction of large woolen mills. The fine wool grown in the Andes of Peru has long been a factor in the world's markets, and there seems no reason, other than lack of transportation facilities, why the mountains of Colombia and Ecuador should not also supply a part of the world's demands. With the industrial development of the country the Colombians will have to face the same problem which has confronted other regions, and will be called upon to decide whether Tequendama is to be preserved for æsthetic reasons or utilised for power.

To the east of Bogotá and in the bottom of a great valley on the eastern flank of this portion of the Andes lies La Union, which was a favourite resort of the families of Bogotá in the days before the railways. Now it is so much easier to go by train to Esperanza, which has a like pleasantly warm climate, that La Union is quite neglected. Situated at the juncture of the Rio Blanco, a delightfully clear stream, and the Rio Negro, a turbid stream filled with minute particles of black shale, and at an elevation of approximately 5,200 feet, within the drainage of the Orinoco, it affords a place for a restful week-end and a pleasant terminus for interesting rides across the mountains. A few miles up the valley and just beyond Choachí is a thermal spring, on a small fault line, and when the valley of the Rio Blanco and Rio Negro was still a favourite resort, it was planned to build a hotel here, but this project has now been abandoned.

La Union may be reached in three ways; the most direct is up through the gap between Monserrate and Guadeloupe into the little shale valley that makes the heart of the Cruz Verde anticline, then across the Paramo of Choachí (11,000

to 12,000 feet), down the eastern escarpment on a most precipitous and rugged trail, through a narrow gap in the lower sandstones to Choachí (6,300 feet), and thence along the valley of the Rio Blanco to La Union, a total distance of about eighteen miles. We were warned that the road was virtually impassable in the wet season, but, having learned that a horseman had come this way, we tried it. In dry weather it would be a very attractive route with its broad expanse of bleak paramo landscape, its wild flowers, particularly the great masses of red and pink and yellow fox-gloves, the rugged escarpment, and the great panorama of the valley with its sides covered with small fields from top to bottom. In the rainy season it is usually quicker to go one of the two longer ways, both picturesque, though to a lesser degree.

The longest route and the one we were told was the best in the rainy season because it traverses only half a mile of paramo, lies along the southwest prong of the Sabana towards Usme and over the main road to Villavicencio and the llanos through Chipaque to the bridge of Cáqueza, and then by a local trail to Ubaque and thence to La Union, a total distance of about 33 miles. The trail leaves the narrow extension of the Sabana at Yomasa, eight miles south of Bogotá, and begins the climb of the bordering rim formed by the sandstones on the west flank of the Cruz Verde anticline. These have been entirely removed by erosion to the east and cause the paramo here to be very narrow. Soon after leaving Yomasa we saw, just to the south, the village of Usme. It was here that the German Federmann was met by a representative of Quesada and, under the settlement negotiated by the Padre des los Casas, Federmann for

a payment of \$10,000 gold resigned all his claims as well as his soldiers, who were thus added to the force of Quesada. Beyond, the trail climbs steeply through acres and acres of fox-gloves to the sharp crest of the range, which it crosses at an elevation of 10,500 feet, in a narrow trench only wide enough for one animal, worn by the constant passing to and fro along this route from time immemorial. Beyond this trench at the summit, the trail descends with equal steepness into the valley of the Rio Cáqueza, a tributary of the Rio Negro. We soon reach Chipaque, the centre of a municipio of 6,500 people, thirteen miles from Bogotá, and 7,900 feet above sea-level. Eight miles beyond Chipaque we leave the main road at the bridge of Cáqueza, 5,300 feet, and passing parallel to the hog-back ridges made by the lower sandstones, reach Ubaque. Beyond, we cross the modern iron bridge over the Rio Negro, just below the juncture with the Rio Blanco, and reach La Union.

The third route lies between these two, and is the direct road from Bogotá to Ubaque and Fómeque. Throughout much of its length it is a paved stone way in very good condition. The recent improvements make it a rather better route than the one via Chipaque, where the road has been somewhat neglected, besides, it is only a few miles longer than the more direct, though often impassable, Choachí route. Starting from the southern end of Bogotá, and passing the brick factories, it goes through the picturesque gorge cut by the Rio San Cristobal into the upper sandstones of the west flank of the Cruz Verde anticline, and then climbs to the summit of the southern extension of the Choachí Paramo (11,600 feet), which it crosses just below the horizon of the upper sandstones. These soon appear to the

left as great walls, while outlying masses are scattered over the undulating paramo to the right. Farther on and below are fields in the more level lands made by the lower part of the upper shales, then the trail passes through a gap in the ridge formed by the lower sandstones along a small stream which jumps over one layer after another in little waterfalls. The valley in which La Union is situated was at the time of the Conquest under the Zipa of Bocatá, and the small stone-enclosed fields which extend from the stream up the slopes on both sides recall the region of Southern Colombia and Northern Ecuador where the Indians still form a considerable portion of the population.

Bogotá, like other Andean towns, is in a region where earthquakes are more or less frequent. Vergara records slight tremors in 1805 and 1827 and stronger ones in 1595, 1797, 1868, 1875, 1885 and 1906, but their intensity is small compared with those which have been experienced to the south, particularly in Ecuador and to the northeast in Santander del Norte and Venezuela. Bogotá does not appear to be located near any centre of disturbance, but rather to be affected by waves originating in other areas.

The business which brought us to Colombia is now finished, and as Lord Murray has withdrawn the offer made for a comprehensive scientific study of the country with special reference to petroleum, we are packing for our departure at the end of the week. I might perhaps explain that, having heard rumours that petroleum deposits existed in Colombia, Lord Cowdray, the head of S. Pearson & Son, Ltd., decided to send a director, accompanied by a technical staff, to enquire whether the Government desired to enter into a partnership with this firm (which, by the way,



Near Fómeque—showing small fields on mountain sides



Choachí

THE VALLEY OF THE RIO BLANCO

had already constructed a short railway in Colombia) with a view to carrying out on a large scale scientific research, with subsequent operations if the preliminary investigations justified. All that we knew of Colombia from a petroleum point of view was that the attempts to prove that commodity along the Atlantic Coast had failed, and large sums of money had been spent in vain endeavour, but we had heard of petroleum in other parts of the country.

In the discussion of this project, first with the Ministers, particularly the able and patriotic Minister of Public Works, Dr. Araujo, later with the select committee drawn from all parties of the House, who unanimously endorsed it, as well as with other members of Congress, we have seen much of the public men of Colombia. They impressed us as straightforward, honourable men, looking only to the interests of their country. Doubtful at first because of the magnitude of the plan, their opinion altered as they comprehended its application and fairness to their country. When, however, our contract reached Parliament for ratification it became obvious that its provisions had been misunderstood in the United States, for a violent and unreasonable campaign had opened against it. In some quarters it was actually suggested that the petroleum contract was only a blind, and that the real object we had in view, as we were known to be a contracting firm, was to build an alternative canal by the Atrato—a not impossible engineering feat, but eminently impracticable. However, as Lord Murray had solid grounds for believing that a serious misunderstanding in regard to our intentions had risen at Washington, which at that time was negotiating with the Colombian Govern-

ment on the question of the indemnity to be paid in connection with the Panama Canal, he withdrew the contract.

In the interests of this nation which to-day needs development and people, I sincerely hope that it will at some time invite some other British or American firm, able to give effect to its provisions, to take up the contract which Lord Murray and his staff worked over so carefully during the many months of our pleasant stay in Colombia.

With very wide practical knowledge of politicians, not confined to his own country, Lord Murray has frequently expressed to me the strong opinion that in parliamentary resource, ability and political instinct, the Colombians take a high rank, and that in some respects they remind him of the Irish, whom shrewd observers at Westminster consider the most consummate parliamentarians in existence. We attended many debates in the House and were impressed by oratory above the average, and saw much of the parliamentary machinery for dealing with the business of the country. Lord Murray favours the Colombian plan of committees to assist ministers, which is framed somewhat upon the French system, and has frequently said that if a similar system were introduced into England—under which all great Government contracts should, before ratification by Parliament, be subject to the approval of a select committee—it would relieve ministers of much invidious responsibility and be far more satisfactory to the competing firms themselves.

EIGHT

THE MAGDALENA



*At Sea, en route from
Puerto Colombia to Colon,*

8th Dec., 1913.

WE have now bid adieu to the shores of Colombia, but the pleasant memories of charming people and beautiful scenery will continue with us to the end. It is a country with many cultural centres, but with altogether a relatively small population, a country predominantly of mountains and with great, though only slightly developed, agricultural and mineral resources, but a country held back through want of adequate means of communication and transportation. To-day it offers little attraction to the poor man—to the immigrants which it needs to people its vast areas—but when trunk lines, such as have been responsible for the development of the mountainous regions of the United States and Canada, are built, then the immigrant will find in Colombia a land of opportunities. To-day he will find little but disappointment. Of mineral wealth there is a great store, but it will require large sums to carry development beyond the present stage, and the ordinary "prospector," like the immigrant, cannot hope to succeed to-day. Colombia needs both capital and immigrants, but such are her geographic characteristics that she cannot secure the latter without the former, though having secured capital, people will follow automatically.

The main commercial artery of Colombia is the Magdalena River. Extending north and south between the two

most thickly populated portions of the country—the northern and lower parts of the Central Andes on the one hand, and the more elevated part of the Eastern Andes on the other—the Magdalena has formed an essential link in all but three of the transportation schemes of the country that have passed even the first step beyond the stage of mere dreams. The exceptions are, the 100-mile railway from Cali to Buenaventura, the 34-mile railway from Cúcuta to the Rio Zulia, and the 60-mile railway extending south from Santa Marta. Even in the latter case the projected extensions involve connections with points on the Magdalena in the hope of diverting a part of the Magdalena trade to the harbour of Santa Marta.

Near the mouth of the river are two lines, one from Baranquilla to Puerto Colombia, 17 miles, and the other from Calamar to Cartagena, 65 miles, both designed to facilitate the conveyance of merchandise between the ocean-going steamers and the river steamboats, and to obviate, in some measure, the difficulties caused by the bar at the mouth of the river. Higher up, at Puerto Wilches, attempts have been made to build a railway, extending from the right bank of the river to Bucaramanga, a distance of 83 miles. As a result of 30 years' effort large sums of money have been spent, a few miles of rails have been laid, but the road has never served any transportation end beyond conveying its own ties and rails. A few miles above is another line, which leaves the left bank of the river at Puerto Berrío. It is quite a busy line, though after almost 40 years of building there are still two uncompleted stretches in the 125 miles to Medellín. Bit by bit this railway advanced from the river, up the valleys of the Malena

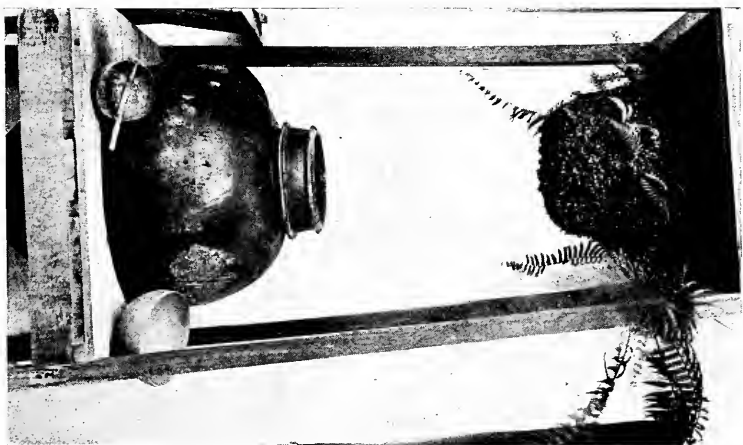
and the Nus until it reached the great ridge between the latter valley and the valley of the Porce in which Medellín is situated. Here it has rested for seven years, while various projects have been considered for overcoming this obstacle. One would almost think that the builders of the road fondly expected this engineering difficulty to disappear when the road reached it. In the relatively level valley of the Porce a section of track has been laid, which extends almost to Medellín, and, therefore, at the present moment, one goes from Puerto Berrío to Medellín in four stages: by rail to Cisneros, 67 miles, then by motor or carriage or saddle animal across the divide to the Porce, by rail part way to Medellín, and by carriage road the remainder of the distance. The construction of 18 miles of a line running south from Medellín toward the Cauca, has been completed, but as a means of transportation it forms only a part of the Puerto Berrío line, with which, on the completion of the latter to Medellín, it will connect.

The next is the Dorada Railway, now 74 miles long, constructed primarily to transport goods around the Falls of Honda, where probably a canal would have been a cheaper and more effective makeshift. From one of the stations on this line an aerial cable-way is being constructed across the Central Andes to Manizales in the valley of the Rio Cauca, and this will serve as a feeder for the railway and steamboats of the Lower Magdalena. Lastly there are the two lines from Girardot, one connecting with the short railways of the Sabana of Bogotá, and the other now extending 15 miles to Espinal, but which will some day be prolonged to Ibagué, and some even dream will climb the Central Andes and fall down into the "Valley of the Cauca."

The source of the Magdalena, like that of the Cauca, the Patía and the Caquetá, is in the mountain-knot where the Eastern Andes separates from the central chain. Starting at an elevation of over 13,000 feet in the little Lake of Magdalena in the Paramo de las Papas (that is the "potato highland"), the Magdalena flows from the beginning to the end of the deep valley between the two chains and then across the interior delta and through the low hills of the coastal regions to the ocean, a total distance of a thousand miles. It is a yellow, turbulent river, with an ever-shifting, sand-bar-obstructed channel, the sport of the hundreds of debris-filled mountain streams which, for two thirds of its length, join it from the ranges on both sides. The head of navigation is usually stated to be at Neiva, 750 miles from the mouth. The first steamboat reached this point on the 12th of May, 1875, and in flood stages of the river small, shallow-draught boats with powerful engines make occasional trips. More frequently the river steamers reach Purificación, 75 miles lower down, but the head of "regular" navigation is at Girardot, 651 miles from the ocean along the windings of the channel. From this point, communication as regular as providence and the stage of the river will permit, often interrupted for weeks or even months at a time, is maintained by small boats on the narrow upper river, by the La Dorada line around the Falls, and by larger boats on the lower river. It is a most inadequate and unsatisfactory means of transportation to serve the needs of a country possessing such an endowment of natural resources, and affords small justification for the large sums spent in the railway developments, and attempted developments, along its course. If all the money expended in this way



Street Scene



Filter of pumice-stone above, with
water-jar below

had been wisely used on projects in which the Magdalena did not figure as an essential feature, the country would be many steps nearer the solution of its all-hampering transportation difficulties. Most of what has been done is, because of the character of the river, only in the nature of local and temporary makeshifts.

Some believe that the capital outlay in these little railways depending on the Magdalena will be more fully justified in time by the improvement of the river, which would make a regular service possible and certain. However, the physical characteristics are such that this hope can never be realised. On the lower 150 miles of the river it will be possible to maintain a regular service, but of this distance the part possibly effective in big transportation problems is less than 100 miles, and the delays and damage caused by unloading and reloading for so short a stretch will mean that this will serve only local needs, and if utilised at all in the through transportation routes of the future Colombia, will be only as a temporary and economically expensive makeshift.

It has been suggested that since Colombia possesses a water thoroughfare running north and south through the country and affording with its tributaries and the various channels and arms of its deltas, navigable waterways, aggregating, it has been claimed, as much as 1,800 miles, it is not only unnecessary but useless to think of parallel railway lines: Perhaps the experience of the United States will be helpful in considering, not only this point, but the possibility of improving the Magdalena navigation to a degree which will make it worthy of consideration in any capacity, except as a temporary and unsatisfactory stop-

gap. The Mississippi River system in the United States includes over 15,000 miles of navigable waterways. Very little of this total mileage can be described as affording ideal transportation conditions, but most of it is much better than the Magdalena and none of it is worse. Yet this whole area is covered with a perfect network of railways which parallel, not once, but many times, the main stream and its tributaries. The Government has spent enormous sums in efforts to improve the navigation of the river. In the thousand-mile stretch between Cairo and New Orleans \$70,000,000 has been expended in attempts to improve the channel of the Mississippi, but with transportation results not commensurate, to even a small degree, with the outlay. Between 1838 and 1908 over eleven millions were expended on attempts to improve the channel of the Missouri, which is more comparable with the Magdalena than the other parts of the Mississippi drainage, but in 1902 the Missouri River commission was abolished, and no effort is now made to navigate anything but the lower tenth of the river, and this only for local trade.

Since the construction of railways the development of the great region covered by the drainage of the Mississippi has been so rapid that the railways have had difficulty in keeping pace with its growth, and there is now developing a strong demand for the improvement of a portion of this river system, particularly that composed of the Ohio and the Lower Mississippi, in order to afford regular water access to the Gulf from the great industrial centres and coal-producing regions of Pennsylvania and neighbouring states, and to assist the railways in caring for the enormous traffic of the region. The Ohio is itself a mightier river

than the Magdalena, navigable throughout a course almost equal to the total length of the latter, with a width of 1,200 to 1,500 feet in its upper portion, and an average of over 5,000 in its lower, as compared with the width of the Magdalena of 300 to 500 feet at Girardot, and an average of 2,500 to 3,000 in its lower reaches. The discharge of the Ohio varies from 35,000 cubic feet per second to 1,200,000, while that of the Magdalena is given by Vergara as 250,000 cubic feet. The improvement of the Ohio, which is now under way, involved the construction of a series of locks with collapsible dams which can be thrown down in times of flood. The completion of this plan, even to the mouth of the Ohio, will involve many years and an expenditure totalling hundreds of millions. Like the Magdalena, the navigable channel of the Ohio is interrupted by a rapids called the Falls of the Ohio, or the Falls of Louisville, around which a ship canal was constructed in 1830. The descent is 24 feet in a distance of two and a quarter miles, as compared with 38 feet in a distance of about a quarter of a mile at the Salto de Honda on the Magdalena. The resemblance between the two streams suggested by these two rapids is purely adventitious, for the Ohio, though a muddy river, quite lacks the mountain and tropical characteristics of the Magdalena, and its improvement is a much simpler problem.

Far from railways not being able to compete with waterways of this type, they have, in the United States, virtually supplanted them, and now the rapid growth and prosperity brought about by the railways has created such a volume of traffic that there is a demand that certain of the waterways, offering special features commercially, be improved, not to

supplant the railways, which is impossible, but merely, in a small measure, to supplement them.

The Magdalena is more truly a mountain stream than any of the navigable waters of the Mississippi system, and the difficulties surrounding its improvement are hence correspondingly greater. The average gradient of the Magdalena is several times that of the navigable tributaries of the Mississippi, and many times that of the main river itself. Thus, the slope of the Ohio in the 967 miles from Pittsburgh to its mouth is approximately 500 feet, or an average rate of about half a foot per mile. The fall of the Missouri River in its "navigable" portion, extending from Fort Benton to its mouth, a distance of 2,285 miles, is approximately 2,000 feet, or about a foot per mile, but the fall of the Magdalena from its usually considered head of navigation at Neiva, 750 miles from its mouth, is slightly over 1,500 feet, or two feet per mile.

Of the several parts of the Mississippi system, the portion of the Missouri on which navigation has been abandoned, after an expenditure of many millions in fruitless attempts at improvement, is more like the Magdalena than any other, but even the Missouri presents a simpler problem than the Magdalena. Both rise high in the mountains, and after a rapid descent, assume a more gentle gradient, which continues with somewhat decreasing intensity to their mouths, but while the whole of the 2,000 miles of the navigable Missouri below Fort Benton is away from the mountains, and across what is broadly a relatively simple plains province, the navigable part of the Magdalena is for two-thirds of its length in a valley flanked on both sides by

mountains, and is altogether a complex river from a physiographic point of view.

The improvements made in the Magdalena River thus far have consisted mainly in removing the trees which, becoming imbedded in the sandbars and channel, make "snags" or "sawyers," and constitute a menace to navigation. As long ago as 1878 a Junta de Canalización was created, which undertook to improve the river, and the Government now has several "snag-boats" and a revenue of \$100,000 to \$150,000 per year available for this purpose. The clearing of the river of such obstructions will always be justified with respect to certain sections, because of the value of these parts for local transportation, but any project for the canalisation of the river or the prevention of its banks shifting back and forth with the constantly changing currents, is, from the very nature of the river, foredoomed to failure, and money expended on such projects will either be entirely wasted or will give results in no way commensurate with the sums spent.

The Magdalena is naturally divisible into six parts:

First—The portion through the present delta, extending from the coast 61 miles to Calamar.

Second—The part from Calamar to Tacaloa, 77 miles through the hills which separate the present delta from the larger interior delta-plain of the Magdalena, the Cauca, the San Jorge and the Cesar.

Third—The interior delta extending from Tacaloa to Banco, a distance along the present main channel of the river, of 84 miles.

Fourth—The section between Banco and the Salto Negro (black falls) or Salto de Honda, covering 334 miles along

the main channel of the river, and including what is sometimes called the Paturia Region.

Fifth—The portion from the Falls to the head of navigation at Neiva, 195 miles.

Sixth—The headwaters from Neiva to the Lake of Magdalena in the Paramo de las Papas, approximately 300 miles.

Because of the break made by the Falls of Honda, the portion from Honda to Neiva is commonly referred to as the Alto (high or upper) Magdalena, while below is called the Bajo (lower) Magdalena. Except for a portion of the headwaters section, all the Magdalena is low enough to fall within the "Tierra Caliente," or "Hot Lands." It is said of the relatively dry Upper Magdalena valley, that it is one of the most healthful of the hot regions of the Americas, and, considering variation in temperature, due to difference of elevation, there is little to choose between the different points on the Upper and Lower Magdalena, but there is a marked dissimilarity in the amount of rainfall and resulting climatic conditions. The rainfall distribution is both interesting and surprising. One would expect to find all the portion between the two Cordilleras a rain-shadow, and that there would probably be a gradual increase in precipitation towards the coast. Indeed there is a rain-shadow area between the two Cordilleras, the great semi-arid plain of the Upper Magdalena, but this is followed in passing down the river by a torrential rain area of dripping jungle-forest also between the two Cordilleras, while beyond, and toward the coast, the hills show only scattered and scrubby tree growth and grazing land. Starting from the mouth of the river, one thus passes through a region of relatively low rainfall, which continues for over 250 miles to a point just

beyond Banco. Here, where the mountains close in, there commences a region of heavy rainfall, which extends a distance of 300 miles toward Honda and covers essentially the fourth division of the river. Near Honda the rainfall grows abruptly less and we enter the rain-shadow area between the two ranges which extend through the fifth and sixth divisions almost to the source of the river.

The limitation of the normal rain-shadow to the southern half of the great valley between the Eastern and Central Andes, and the presence in its northern half of an area of heavy precipitation is one of the anomalies of the rainfall distribution in Colombia. With our present incomplete information, we can only suggest that it is due to entirely local causes. The evaporation from the numerous water surfaces in this lower portion of the valley would, because of the encompassing ranges, be confined to that locality, and the matter, therefore, resolves itself into a round of tropical evaporation and precipitation on the same spot. This does not occur in the upper half of the valley, as the area of water surface available for evaporation is much less, and the chance of wind movement perhaps greater. If the interior delta were closely surrounded by mountains, one would, on this theory, expect a similar phenomenon, but as it is not closely shut in, only a portion of the evaporation falls in the same spot, and it is probable that part of the moisture from this area is conveyed by the winds into the neighbouring mountain pockets, and becomes a factor in the heavy precipitation in those mountain-enclosed parts of the Magdalena and Cauca, just to the southeast and southwest of the interior delta. The relatively dry character of much of the Caribbean coast region of Colombia, which reaches

extreme aridity in the peninsula of Goajira, is apparently a question of the direction of the prevailing winds. Toward the west the rainfall along the coast grows in intensity. It is very heavy in the region of the Gulf of Urabá and westward along the coast of Panamá.

The maritime delta of the Magdalena, beginning just below Calamar, has a length of about 50 miles. It is traversed by the main river, which at Barranquilla divides into two channels, one leading straight into the sea at the Boca de Ceniza, formerly called the Barra Nueva, and the other a more winding channel whose outlet is at the Boca de Rio Viejo, nine miles northeast of Barranquilla and an almost equal distance east of the Boca de Ceniza. In addition there are a number of minor distributary channels leading into the Ciénaga de Santa Marta, a shallow arm of the sea lying between the river and the Santa Marta mountain mass. To the west of the river and extending almost to its mouth are the Uplands of the Tierradentro, sometimes called the Cordillera de Barlovento—the Windward Mountains—a name rather surprising in a country with really great cordilleras. The hills of the Tierradentro are rugged in a small way and have a mean elevation of 500 to 600 feet. The culminating point, not far from Barranquilla, reaches a height of 2,500 feet and some of the hills towards Cartagena are over 1,600 feet high. These hills touch the coast between Cartagena and Puerto Colombia, and the extreme tip of the Magdalena Delta lies less than five miles north of their northern end. On the whole, the land built by the Magdalena River in its delta portion is really so very small and so out of proportion to the size of the river and the amount of sediment carried, as to suggest either that this

portion of the coast is affected by very strong ocean currents or that the present relative position of sea and land has not been long established at this point and that there has been very recent subsidence.

Such is the nature of this area near the mouth of the river that the Magdalena not only has tributaries in its delta section below Calamar, but the most important of these, coming from the Tierradentro, presents the anomaly of being a southward-flowing stream joining the northward-flowing master drainage of the region.

Unfortunately, precise levels are not available for a study of the slope of the delta. We sought to get a check on the elevation at Calamar through the railway levels, but although the manager of the railway from Cartagena to Calamar very kindly endeavoured to find for us in the local archives of the company profiles of this line, he was unable to do so. Señor Ismael José Romero, in a little work on the railways of Colombia and the Magdalena, "for use in schools and colleges," gives the elevation of Calamar as 147 feet, which, as it differs materially from other published sources, may have been derived from the railway levels. The best data at hand are the elevations reported by the British engineer, F. A. Simons, who made maps of the Departments of Bolívar and Magdalena for the Colombian Government. These are adopted by Vergara in a map published in 1907 in preference to other figures given in his *Geography of Colombia*, issued some years before. The Simons elevation for Calamar is 72 feet, and as this place is 55 miles from the sea in a straight line, it gives the slope of the surface of the delta as over a foot and a quarter per mile. Lower down the elevation of Cerro de San Antonio on the east side of the

river, where the first distributary to the Ciénaga de Santa Marta leaves it, and of Campo de la Cruz on the west, are both given as 65 feet. These points are fifty miles from the ocean. Suan, El Peñon and Salamina are given elevations of slightly over 45 feet, and from the position of these places, with reference to the ordinary stage of the river, the usual gradient of the water-level is inferred to be slightly less than a foot per mile.

This gives to the delta section of the Magdalena a gradient equal to that in the upper reaches of the Ohio, whereas the slope of the Ohio in its lower reaches is only .29 foot per mile, and the slope of the water surface in the Mississippi, in the delta section below the mouth of the Red River, is less than one sixteenth of a foot per mile at low water and one sixth of a foot per mile in flood stages. The average slope of the surface of the delta of the Mississippi is slightly less than a quarter of a foot per mile, in the 200 miles above the mouth. The delta of the Magdalena thus has the slope of the tributaries of the Mississippi in their sections near the mountains, and the suggestion from this extraordinary gradient, which is corroborated by other features of the river, is that the Magdalena is a stream so overloaded with sediment that it must maintain an abnormal gradient to carry its load to the sea. In this respect it recalls some of the streams flowing east from the Rocky Mountains in the United States, which, although they have a high gradient, are unable to degrade their channel, because of their overburden of sediment.

At Calamar a channel, partly natural and partly artificial, leaves the Magdalena on the west side and passes through a low place in the range of hills, which, north of this gap,

is called the Tierradentro and south the Montañas de María. This is the Canal del Dique, often simply El Dique. It leads to the southern end of the magnificent harbour of Cartagena, a total distance of about 85 miles, and has a number of shallow openings into the sea south of this port. The Dique was constructed by the Spaniards in 1570, when Philip II was sovereign of Spain, by connecting existing channels and lakes, and it afforded the main avenue of transportation between the coast and the Magdalena until the troublous times of the Wars of the Independence. It then fell into disuse and was soon rendered impassable by the accumulation of silt and vegetation. Then began the decline of Cartagena and the growth of Barranquilla. An attempt was made in 1846 to reopen the Dique, but without success. The effort was repeated in 1881, and for a few years light draft steamboats belonging to an English company plied along this route. However, with the completion of the railway between Cartagena and Calamar across the hills of the Tierradentro in 1894, this channel was no longer maintained. It is now choked with silt and water vegetation, but will again become a channel of commerce with the growth of Colombia.

The appearance on maps of a waterway leading as this one does from the lower part of the Magdalena to the sea, is responsible in some quarters for the rather erroneous conclusion that this is an ordinary deltaic channel of the Magdalena and that the whole of the area from the southernmost opening of the Canal del Dique into the sea to the Ciénaga de Santa Marta, represents delta land constructed by the Magdalena. So self-evident does this appear from a casual study of the usual maps that the geologists

of the United States Geological Survey have felt justified, on a map published by that organisation in 1911, in showing a great belt of alluvium 80 miles wide covering this whole area and extending up the river to latitude 8 degrees 30 minutes, instead of leaving the area blank, as was done in the same map with respect to areas where there was no accurate information available. The error is a very natural one and the basic cause lies in supposing the Magdalena analogous to the Mississippi—only it happens that the Magdalena has quite different characteristics.

Above Calamar the river passes through the hill-lands which separate the present maritime delta from the interior delta-plain of the Magdalena, the Cauca, the San Jorge and the Cesar. This hill-land belt extends across the course of the Magdalena, connecting the Santa Marta mountain mass on the one hand with the Montañas de María, on the other, and the river passes through it in a slightly sinuous trench. The river is to-day not deepening this trench, but filling it, as is indicated by the lakes that occur in the lower ends of all the tributary valleys in this portion of the stream. These hills rise to heights of from 300 to 400 feet above sea-level, and it is in this region that we expect to see the high-level bridge on the great trunk railways spanning the Magdalena without interfering with steamboat navigation. The drainage from this transverse hill-land is for the most part toward the interior delta-plain and the waters of the Arroyo de Chimiquica, which takes its rise 30 miles east of Calamar, run parallel to the Magdalena for a distance of 60 miles, but while the Magdalena is flowing northward, the Chimiquica is going south and its waters only join those of the Magdalena in the interior delta area.

The Montañas de María, also called the Montañas de las Sabanas, or the grazing uplands of Bolívar, extend north and south between the Sinú on the west and the second and third sections of the Magdalena on the east. Toward the south this upland connects by low hills with the Cerro Murucucú, a peak over 6,000 feet high on a spur of the Western Andes. These connecting hills, though 250 feet above sea-level, rise so little and so gradually from the major drainage channels on either side that they are of slight topographic importance. Toward the north the upland becomes higher and its crest line is between 500 and 1,000 feet, with occasional elevations of 1,500 to 2,000. The culminating point is 30 miles southwest of Calamar and 20 miles from the depression of the Dique. Here the María Range is 3,000 feet high with a culminating point called El Manco or Cerro San Martín, which has doubtfully been determined to have an elevation of 4,475 feet. This area forms an important cattle-raising and tobacco-growing section free from the deluges of rain which one naturally associates with South American tropical lowlands and is a section which would be traversed by the trunk railway serving the western part of Colombia between the Central and Western Cordillera.

To the west of the southern part of the Montañas de María there is an interior delta area, in the drainage basin of the Rio Sinú, analogous to, though smaller than, the interior delta of the Magdalena. Below this depression the Sinú passes through a belt of low hills to its maritime delta section. It is rather interesting to find that this ridge is on a prolongation of the axis of the hills which the Magdalena cuts through in its second division, and that the

depression through which the Dique passes has a parallel southwest-northeast trend, on the prolongation of which lies the Ciénaga de Santa Marta. The broad suggestion is of recent folding or wrinkling, having a southwest-northeast trend.

The upper limit of the second division of the Magdalena may be fixed somewhat arbitrarily, at Tacaloe, near the foot of the interior delta region. The elevation of this village and of the neighbouring settlement of Tacamocha, both in the lowland bordering the river, are given by a number of observers at figures ranging from 115 to 125 feet above sea-level. The portion of the river between Tacaloe and the sea is, from the standpoint of navigability, the most important part of the Magdalena. The distance is 138 miles along the meandering course of the river, the mean width of the stream is half a mile, the channel is without small sharp turns and the depth is variously stated as between twenty and thirty feet. Some hope that with the improvement of the Boca de Ceniza and the maintenance of a channel of 30 feet of water across the bar, ocean steamers will ascend this section of the river. There hardly seems economic justification for such a hope. The conditions on the coast of Colombia are very different from those which forced the location of New Orleans many miles from the mouth of the Mississippi. In the case of New Orleans there was no other place nearer the mouth where a city could be placed, and the site, apart from its commercial advantages, is not one which would be chosen had there been any higher and drier place, and there were no near-by natural harbours such as Santa Marta and Cartagena.

Above Tacaloe lies the interior delta or third division of the river. It is a great alluvial area with low hilltops and ridges sticking through the plain, here, there and everywhere, amidst which the streams form an intricate network of channels that crisscross the flat portions of its surface delta-wise in almost every direction. From north to south it extends from Tacaloe up the Cauca, to near the mouth of the Nechí, a distance of a hundred miles; and from east to west it reaches ninety miles from the neighbourhood of Chiriguaná in the Cesar drainage to Caimito on the Rio San Jorge. It is an area of recent and local depression, and though once a region of hills and valleys, the old topography has been all but buried by the sediment brought into the depression by the tributary streams. Indeed, to-day, only the very tops of the highest of the old hills are visible.

Into this depressed area come the Cauca and San Jorge from the southwest, and the Magdalena from the south, all issuing from rather narrow mountain-enclosed valleys, while from the northeast comes the Cesar, flowing through a broad plain which is described by all who have examined it as one of the great agricultural regions of the future Colombia.

Of the streams tributary to this interior delta, the most important in point of volume and sediment is the Magdalena, and the least the Cesar. The San Jorge, though of less length than the Cesar, heads in a rain-drenched mountain pocket and therefore carries a greater volume of water than the Cesar, which comes from an area of relatively low rainfall. The Cauca is naturally second in importance. The result of these differences in the four main rivers is

that the Magdalena has been able to build up much more rapidly than the others. Its fall across the depression has a slope from near Banco to Tacaloe of 48 feet in a direct distance of 59 miles. The result of the greater aggradation of the Magdalena has been to pond the waters in the lower part of the Cesar and form the Lake of Zapatosa, which, according to Vergara, has an area of 385 square miles, and a depth of 20 to 25 feet. The greater volume of water and amount of sediment carried by the Cauca has enabled that stream to prevent the formation of a similar lake at its mouth, but the lowest and levellest portion of the interior delta lies in this Cauca-San Jorge portion of the depression. At the beginning of the last century the main water-way of the Magdalena ran from Banco past Mompós to Tacaloe, then at the mouth of the Cauca, a distance along the meandering river of 71 miles. Distributary channels led from the more elevated bed of the Magdalena toward the slightly lower Cauca, and each flood changed their relative importance. One of these arteries, called the Brazo de Loba, led across the delta area from Banco and joined the Cauca at a point 45 miles above its mouth. In 1868 the river definitely abandoning its main channel via Mompós, and adopting the Brazo de Loba, usurped the lower 45 miles of the Cauca. The effect of this change, while it sent the main river through the lower ground, was to lengthen its course between Banco and Tacaloe from 71 to 85 miles, and to decrease its average gradient. The Mompós channel, which the river silt had built above the surrounding level, then became only a series of pools during low-water, and Mompós, until then the most important town on the banks of the Magdalena, was left 20 miles from

the main channel and fell into decay. When the silt of the Magdalena has built up its new, tortuous, longer Loba route, the river will again return to the old Mompós water-course because this is the shortest route to the sea.

It has been suggested that the Magdalena formerly turned northeastward, and flowing in the valley between the Santa Marta mountain mass and the spur of the eastern Andes which forms the boundary between Colombia and Venezuela, entered the sea in the Goajira region. This depression is to-day occupied by the Rio Cesar, which, flowing southwest, joins the Magdalena, and the Rio Rancheria, which, running to the northeast, enters the sea at Rio Hacha. As I have not had the opportunity of personally examining this supposed ancient course of the Magdalena, I can only say that although the theory may be correct, the evidence, so far as can be judged from published maps, is decidedly against this hypothesis. The general character of the Cesar and the directions from which most of its tributaries join it, is opposed to this theory, although these facts are in themselves not conclusive in a region possessing peculiarities such as have already been noted. Other lines of evidence, however, point in the same direction. For the divide between the Cesar and the Rancheria, Vergara adopts the elevation of 675 feet, determined by Sievers. Therefore it follows that if the Magdalena did at one time flow to the sea along this route, it was diverted by rapid folding which elevated the point occupied by the present divide from less than a hundred feet to its present height. Such a fold would have to have a northwest-southeast trend which is diametrically opposite to the general structural lines of this northern part of Colombia. The whole depression oc-

cupied by the two streams has a northeast-southwest trend which is also that of the adjoining mountain masses. The elevation which separates the Sinú interior delta from the sea is but the prolongation in a southwest direction of the elevation between the Magdalena interior delta and the ocean, and, although it may only be a chance happening, the axis of the depression traversed by the Dique has the same course, and its prolongation to the northeast is occupied by the Ciénaga de Santa Marta. Altogether the general evidence is opposed to an ancient course of the Magdalena along this route, but there may be local and special evidence, of which we are not aware, that would prove this theory.

We have somewhat arbitrarily fixed the upper limit of the interior delta at Banco, where there is the great bifurcation of the Magdalena into the Mompós and Loba channels. The delta might perhaps be considered as continuing above Banco to Badillo, situated just beyond the mouth of the Lebrija, where the river first begins to break into large "brazos" or arms. An additional reason for extending the delta limit to the south of Banco is the fact that one of the channels connecting the Cesar and the Magdalena branches from the main river fifteen miles above Banco. Along this channel the water flows part of the year in one direction and part of the year in the other, depending on the relative stage of the water in the two streams. If the head of the interior delta is considered as occurring at Badillo, the length of the Magdalena in the third section would be increased from 84 miles to 139 miles and the length assigned to the fourth section would be decreased to 279 miles.

Below Badillo the mountains to the west of the river

are not high enough to interfere seriously with the atmospheric circulation, and the precipitation is therefore not much heavier than to the north. South of the latitude of Badillo the range to the west is of such a height that it gives to this section the character of a veritable mountain pocket, and in this region, where the winds cannot shift the moisture clouds away from the valley, there is no relief from the rain. It is this peculiar rainfall area, famous for the unhealthy nature of its climate, for its exuberant vegetation, for its floods and for the difficulties of the navigation of the Magdalena within it, that the Colombian geographer, Vergara, considers as constituting a black cloud on the horizon of Colombia and a problem of vital importance in connection with the future progress of the country. With this we should be inclined to agree, did we feel that the future of Colombia was bound up with the Magdalena. On the contrary, we believe that the sooner the leaders of this nation are able to abandon all thought of the Magdalena, as a main avenue of traffic, the sooner will the country make a real step forward in its growth and development, and we therefore are inclined to give little weight to the blighting effect of this narrow belt, which Vergara characterises as "more water than land and more mud than water," and to consider rather the extensive healthy uplands which flank it on both sides.

To the west of the Paturia division of the Magdalena is Antioquia, with three-quarters of a million of people, a fertile soil and truly a golden heart. Its hills are everywhere cut with gold-bearing veins, and its valleys are rich placers. Its centres of population are, Yarumal, 21,000, elevation 7,500 feet; Medellín, 71,000, elevation 5,000 feet; and Son-

son, 29,000, elevation 8,000 feet. To the east of the Paturia are the elevated lands of the Eastern Andes, in the Departments of Boyacá and the two Santanders, with a million people, a great diversity of climate, large areas of agricultural lands suited for the growth of many different products, and deposits of copper, coal, petroleum, and a little gold and silver, together with the world's most important emerald mines. The centres of population in the western side of this upland, and nearest the Magdalena, are Ocaña, 17,000, elevation 3,800 feet; Bucaramanga and Rio Negro, which together have a population of 34,000, elevation 3,000 feet; Zapatoca, 10,500, elevation 5,600; Barichara, 11,000, elevation 4,300; Socorro, 11,000, elevation 4,000; Bolívar, 12,000, elevation 6,000; Jesús María, 13,000, elevation 6,300; Puente Nacional, 12,000, elevation 5,300; Moniquirá, 11,000, elevation 5,600; Chiquinquirá, 14,500, elevation 8,500.

Between this elevated and healthy eastern upland and the Magdalena, and in the heart of the Paturia region, there is the area of the Opón and Carare, still occupied by savage Indians, who fiercely resist with poisoned arrows any incursion into their country. It is a sad commentary on the unhealthy and forbidding character of the Paturia region that this part of the route followed by Quesada and his devoted band in the first journey made by the Spaniards from the coast to the mountain-parks of the Eastern Andes—the Kingdom of New Granada—should still be held along the Opón by aborigines so savage that the passage through their country is attended with no little risk and danger.

In this Paturia division of the Magdalena there are, according to the Codazzi maps, shallow lakes of the type

which are characteristically found along a river building up its channel in a flood plain. These occur on both sides of the Magdalena to a point a few miles above Puerto Berrío, or 450 miles from the sea. Within this area there are evidently large tracts subject to overflow, and the slope of the river between Puerto Berrío and Bancois, according to the most reliable information, about a foot and a quarter per mile. Between Puerto Berrío and La Dorada, the present head of navigation on the Lower Magdalena, the slope is a foot per mile, according to the elevations adopted by the two railway lines. The suggestion that the river has a less slope in the immediate section above Puerto Berrío than below is very interesting, but the elevation data on which the calculations are based are not sufficiently reliable to warrant too positive a deduction upon differences so slight. However, we are inclined to believe that it is true, because of the interesting phenomenon at the "Angostura de Nare," which may broadly be translated as the "Narrows of the Magdalena near the Nare." The Angostura is situated just below the mouth of the Rio Nare, 22 miles above Puerto Berrío, and here the Magdalena passes with considerable velocity through a straight trench, 400 feet wide, 100 feet deep and a little over a mile long, cut through a low belt of hills. The strata forming these hills show, at the upper end of the Narrows, a gentle inclination to the south, while six miles below, at the Peñones del Hermitaño, they slope to the north. The whole suggestion is of a slight wrinkle or fold, which, in very recent geologic time, has developed across the river, but which is forming so slowly that the river is able to trench the ground almost as rapidly as it rises. Such folding would tend, until the

stream had entirely readjusted itself, to decrease the gradient of the river above it.

From the Angostura to the source, the Magdalena is now cutting down, but from the Angostura to its mouth it is building up. The cutting down is exemplified by that still in progress at the Angostura and in the rocky shoals and rapids which are found at intervals to the source of the river. The effect of the building up is seen in the Ciénagas which flank the river on both sides through the Paturja region, in the Lake of Zapatosa, and in the string of lakes and marshes which occur along the east side of the old Mompós channel, as well as in the lakes which are found at the lower end of virtually every tributary of the river where it traverses the hill-lands of the second division. The slope of the Magdalena from the Nare to the sea, approximately a foot per mile, is high for a river of this size, and the fact that it is building up its channel even with this slope shows that the river is heavily overburdened with silt—a very serious consideration in connection with any attempted improvements.

Between La Dorada and Honda the river is not only very narrow and crooked but rises rapidly to the crest of the Falls of Honda or Salto Negro. The railway levels give a difference in elevation of 144 feet between these two places, a distance along the river of 24 miles, but this includes the whole of the Falls. These rapids are stated by Perez to fall two metres in the first 150 metres, $9\frac{1}{2}$ metres in the next 200, and 3 metres in the two miles to the old Bodega at the landing-place used before the construction of the railway. This gives a total fall of 46.5 feet in slightly less than 2 miles, and leaves a descent of 97.5 for the remaining

22 miles to La Dorada, or an average slope of 4.4 feet per mile.

La Dorada thus represents the normal upper limit of navigation on the Lower Magdalena. Steamboats first reached the port of Conejo, which is on the opposite bank of the river from La Dorada, in 1824, but it was not until 1840 that a boat ascended above this point. In that year the steamboat, "La Union," reached the Vuelta (whirlpool) de la Madre de Dios, ten miles higher up, and in 1852 the "Manzanares" reached Caracolí, afterwards called Bodega de Honda, two miles below Honda, which, until 1884, was the port for all freight and passengers to and from the upper country west of the Magdalena, just as Bodega de Bogotá on the opposite bank of the river served the country to the east. In 1884 the railway line round the falls was opened from Yeguas, 14 miles below Honda, to Arranca-plumas, one mile above the rapids. Yeguas is situated just below Vuelta de la Madre de Dios, but the terminus was found unsatisfactory, because of the sharp turns and rapid-flowing water below, and in a short time the line was extended to La Dorada, which thus, after a lapse of half a century, again became the head of navigation.

The nature of the Falls of Honda is such that boats can go down it at certain stages of the water, but with some risk and danger, and, at times, can haul themselves up with their windlasses. The first steamboat passed up the rapids about 1870, and there were four boats on the upper river in 1873, but the uncertainties of navigation were such that nearly all goods and passengers for the region of Bogotá continued, until the completion of the Girardot Railway, to pass along the Honda mule-road, famous for its

mud-holes and its steep ascents and descents. This road is still used to some extent and one of our party demonstrated that it was possible to go from Bogotá to Facatativá on the Sabana Railway, then along this road to Honda and on the railway from there to La Dorada, in less time than was consumed by the "express" mail service via Girardot and the boats of the Upper Magdalena. Sometimes the mail service goes more quickly, but during our stay in Bogotá it would often have been possible, by hard riding over the Honda trail, to do the journey from Bogotá to La Dorada in less time than by the mail service.

The casual examinations which we were able to make of the Falls of Honda and the surrounding country suggest that the principal factor in the formation of these rapids has been the Rio Gualí which, in times past, has built a great alluvial cone or fan into the valley of the Magdalena, the effect of which has been not only to obstruct the river but to crowd it to the western side of the valley. In the formation of this cone, which is abnormally large, compared with those formed by neighbouring streams of similar size, the volcanoes of the Tolima group have doubtless been an important contributing factor. The most recently active volcanoes of this group lie toward the head of the Gualí, and it would appear that much of their debris has been carried down this channel to form this great fan across the Magdalena. The older material in the cone has been consolidated into layers of conglomerate which the modern stream, no longer overloaded with the volcanic debris, has cut into fantastic forms. The Gualí now flows on the northern side of the fan, and the sloping terrace lands along it, lying below the level of the old summit of the cone, suggest the

relatively feeble last discharges from the volcanoes, following the great eruptions of prehistoric times.

The Magdalena has naturally done its utmost to cut through this obstruction and to overcome the displacement produced by it. As a result, the banks of the river immediately above Honda are so irregular and precipitous that, in extending the railway south from Honda, the engineers have preferred to follow the terraces of the Gualí to Mariquita, located twelve miles from the river, involving a climb of almost 1,000 feet, rather than undertake the heavy work required in building a railway along the river itself. From Mariquita this extension of the railway descends again to the Magdalena, which it reaches at a point now usually called Beltrán, opposite the old river-landing of the same name and a mile and a half below Ambalema. The distance along the railway is 49 miles and by river 39.

The height of Honda above the sea, according to the figure adopted by the railway engineers, is 669 feet. The elevation of Girardot, adopted by the engineers of that railway, is 1,066 feet. This gives the river between Girardot and the Falls of Honda a slope of 397 feet in a distance of 95 miles or 4.2 feet per mile. In this portion of its course the river varies in width between 300 and 1,200 feet, and its navigation is rendered difficult by the presence of a number of rapids, produced by the rock masses which project part way across the channel, and are of such a character that, with the gradual wearing away of the Falls at Honda by the Magdalena, they will probably not only increase in importance, but others will appear. Boats going down the river pass these with danger and those coming up, with difficulty. The worst of these rapids are at Colom-

baima, and near Venadillo, five to ten miles above the terminus of the Dorada railway at Beltrán. In good stages of water, boats go up these rapids only with effort and the expenditure of much power, and necessarily very slowly. At other times cables are stretched ahead to the buoys which have been placed at convenient points and the boats get through with the combined action of their great stern-paddlewheels and their windlasses. From Girardot to Neiva, the usually recognised head of navigation on the upper river, the average slope is about five feet per mile.

During the time when Colombia was a colony of Spain the Magdalena was, as to-day, the principal commercial artery of the country. This was before the days of steam-boat navigation, and the journey from the coast to Bogotá was a very serious undertaking, requiring two months' time, even in the case of the British Commissioner, Colonel Hamilton, notwithstanding the special efforts made to secure speed. Travel along the river was in flat-bottomed boats, called champan, which were propelled up stream by poling. Colonel Hamilton's journey from Bogotá to the coast consumed three weeks, of which only twelve days were spent on the river between the Bodega near Honda, and Barrancanueva, the old landing-place for Cartagena, five miles above the present railway terminus at Calamar.

Colonel Hamilton says of his trip up the river in 1824: "Our largest champan was about sixty feet in length by seven in breadth, two feet from the water's edge; the height of the convex covering in the centre is six feet six inches; it is made of bamboos, strong and flexible, covered with palm-leaves, and fastened well together by tough twigs. The complement of men for a champan of this size

is the patron, a pilot who steers with a large paddle at the stern, and twenty-two men, who all use poles twenty feet in length; part of them on the top of the covering, and the remainder in the bow of the champan: the pole is fixed against the shoulder, which becomes in consequence hard and callous. I think the passage up this river, from confinement all day in a champan with the pole-men, the intense heat of the climate, the swarms of mosquitoes of different sizes and sorts, of which there are five, and sleeping on hot sand-banks, is as bad and uncomfortable a pilgrimage as a human being can well have to perform. This being the case, the traveller can have but one object, which is to shorten the penance as quickly as possible. It is a singular but well-known fact that these champans are exactly the same boats in shape and construction as those made by the Indians, or aborigines of the country, for the navigation of the river, before the conquest of them by the Spaniards. All improvements of means of transport were checked by the old Spaniards; since it was evidently the policy and great object of the court of Madrid, that the different provinces of these extensive colonies in the New World should have as little communication as possible with each other, in order to keep them in ignorance of their strength and resources; therefore the traveller meets with numerous obstacles and difficulties in navigating the rivers, crossing the plains, and going over the mountains of this immense country."

We have made three journeys along the Magdalena, one up the river and two down, and owing to the favourable stage of the water and to the special arrangements made for Lord Murray, succeeded in going from Cartagena to

Bogotá in seven and a half days and returning to the coast in four and a half. However, the usual time is much longer, even when the river is not low, and the traveller who makes the journey in ten days going up and seven days coming down, can consider that he has made very good time. Generally the traveller should allow for the up-trip two or three weeks from the time he leaves the ocean steamer, and ten days to two weeks for the trip out. Low water quite interrupts navigation from time to time, even for the small boats which replace the larger ones when the river falls below a certain point, and which carry very little cargo. Owing to this it was two months from the time the present British Minister first touched the shores of Colombia until he reached Bogotá, and the diary of everyone who has spent any time in the capital will contain occasional entries like this: "The mail, which should have reached here five days ago, is still on the way. The last report says the steamboat is stuck on a sand-bar, so we can form no definite idea of when it will arrive."

Shipments between Bogotá and the coast are very slow and expensive. Under the existing scheme of transportation the goods must be handled seven times at a minimum and thirteen times at a maximum, in order to be transported a distance of 774 miles, and the number of handlings is generally the maximum, rather than the minimum. For example, a box of goods, when landed from a steamer at Cartagena, goes into the warehouse, and then to the train, or into the train direct, involving one or two handlings as the case may be. At Calamar it usually goes from the train into the warehouse, and then to the river boat, rather than direct to the steamer itself. The same thing happens

at La Dorada, Beltrán, Girardot and Facatativá, before it finally reaches the station at Bogotá. Our only experience with the freight service was in connection with a small box, which was just six weeks in getting from the coast to Honda, and another two weeks in getting from Honda to Bogotá, notwithstanding frequent attempts by telegraphic messages to hasten its delivery.

The boats of the Magdalena are of the flat-bottomed, stern-wheeled type, common on the Mississippi system, and carry all the cargo on the decks. The boats burn wood, which, cut into appropriate lengths, is stacked anywhere along the stream where the boats can land, and many stops are made and much time taken up in "loading wood." In the lower part of the river, barges filled with this firewood are attached to the side of some of the "express" boats and the unloading is done while steaming along. However, this expedient is not possible above Puerto Barrío, because of the narrowness of the river. There are a number of competing steamboat lines, one of which belongs to the merchants of Antioquia, as anyone familiar with the characteristics of the Antioqueños would expect—to the inhabitants of Antioquia, even the people from Bogotá and from the coast, are "foreigners." The boats on the lower river vary from 80 to 400 tons register, and most of the steamers are from 200 to 300. On the upper river the boats are from 75 to 125 tons.

All the boats have a limited number of cabins for passengers, opening out of the dining saloon, but passage money does not, as on the Mississippi boats, include the right to a stateroom, for which an extra payment is required. Cots are furnished in the staterooms, but no bed-

ding, and the traveller needs to supply his own mosquito bar, towels, sheets and pillows. The food is generally indifferent, and, while a considerable improvement is now being made, many people find it desirable to carry a box of tinned provisions with them. The water served is from the Magdalena, sometimes filtered, oftener not, and while this will not shock people who have lived on some of the rivers of the Mississippi system, a case or two of bottled water will suit most travellers better, and must be provided by the passenger before he starts the journey.

The "express" mail service has, in the past year, left Bogotá on Thursday or Friday, and generally reached the coast about a week later. The latest posting time is half past three the preceding afternoon, in order that the mail may be prepared to leave at 7.30 the following morning. On our trip down the river in May last the schedule was an all-day run on Thursday to Girardot, where we spent the night, then the steamboat on the Upper Magdalena to Beltrán, which is reached at noon on Friday. The distance from Beltrán to La Dorada is 74 miles, and the train can easily reach it in three to four hours, including stops, but the mail steamer does not leave La Dorada till Sunday noon, and this, for the regular traveller, means a day and two nights in the hotel at Honda, or, if he prefers, the hovels at Beltrán or La Dorada. Delays of this sort cause travellers to occasionally prefer the old Honda mule-trail, a more picturesque way, and, under some circumstances, more comfortable! The service is, however, improving, and in recent months the mail train has left Bogotá on Friday morning at 7.30, reached Beltrán about noon Saturday, and made direct connections with the boat at La Dorada,

which left that place every Saturday afternoon or Sunday morning, depending on whether the stage of the river would permit navigation at night.

This was true of our last journey down the river, beginning on Friday, the 28th of November. The trip across the Sabana to Facatativá was different from the former ones in the respect that the scene was now familiar and the different hills around the rim all brought up recollections, some pleasant, some amusing, some both. At Facatativá we had the pleasure of again seeing Mr. Cutbill, during the moments occupied in transferring the passengers and mail from one line to the other. Climbing the rim, we passed along the many-looped track to Zipacón, with its numerous little coal pits, and to Esperanza, where the down-train meets the up-train and both stop while the passengers have luncheon. Girardot is reached at 5 o'clock in the afternoon—nine and a half hours for a journey of 107 miles—and here the passengers spend the night in a heat quite oppressive after the cool air of Bogotá. The boat leaves early in the morning, and there is a great hurrying of carriers down the steep road to the landing-place, getting all the luggage aboard and properly stowed away before the boat casts off at 6.30. The fifty-six-mile journey from Girardot to Beltrán, made in four to five hours by the boats going down stream, and in thirteen to fourteen hours by those coming up, is chiefly notable from a scenic standpoint for the beautiful views of the mountain ranges on both sides, particularly the distant Tolima and its sister snow-capped peaks of the Central Andes, and from a geologic point of view, for the complex folding along a part of the course of the river.

At Girardot the river is only 300 feet wide, with marked rocky ledges, along which one can always see scores of people washing clothes. It is the accepted laundry place for the whole town. Below the iron bridge and the little rapids called the Salto de Flandes the river turns abruptly to the west, and follows the course of an anticline, whose flank's dip 35 to 50 degrees. After about two miles the river turns to the northeast and meanders along the axis of a steep-sided syncline to Nariño, thirteen miles below Girardot, where, turning slightly, it passes at right angles across an anticline and the adjoining syncline to the flank of the next anticline. This it follows to the north and runs through a little gorge produced by a harder layer, which passes across the river, on the northward plunging axis of this fold, about a mile south of Guataquí. Below, the river widens to 1,200 feet, but soon contracts to about 600.

The village of Guataquí is located at the point on the Magdalena which, before the construction of the Girardot line, was not only the nearest, but the most accessible, to Bogotá. From this point Quesada, Belalcazar and Federmann embarked in boats on their return journey to Spain in May, 1539, nine months after the founding of Bogotá, Quesada and Belalcazar to present their respective claims to the King of Spain, and the German with the purchase money he had received from Quesada. Two years later, the Licentiate Jeronimo Lebron, for a short time Governor of Santa Marta, who had come to the uplands of the Eastern Andes in an attempt to take possession of this area as a portion of his domain, embarked from this same spot, with 25 out of his original 300 followers. Markham records that Lebron brought the first Spanish women and the first

supplies of wheat and vegetable seeds to the Kingdom of New Granada. The wheat industry of the eastern uplands, therefore, dates from this time—maize and potatoes were indigenous, and had been cultivated by the Indians for many centuries before the arrival of the Spaniards. In the early days the route to the Kingdom of New Granada appears to have been up the Magdalena to the mouth of the Opón, then up the Opón and over the mountains to Vélez, and thence to Bogotá, while the route down was from Bogotá to the Magdalena at Guataquí, and thence along the river, over the Falls of Honda and on to the sea. Guataquí is also located at the point where the direct route from Bogotá to Ibagué, which was founded in 1551, crosses the river. It is, therefore, surprising to find that the 1912 Census Report only gives the year of foundation of Guataquí as 1791.

Below Guataquí, when the boat tied up to the bank to replenish its stock of wood, we found a number of Cretaceous fossils, thus establishing the general geologic age of at least a portion of the rocks along this section of the river. Between Girardot and Beltrán, there are a number of places where the rocky ledges come out into the river bed from beneath the alluvial banks, and confine the river in narrow channels of rapidly flowing water. Finally we pass with a rush over the larger rapids at Venadillo and Colombaima, where the wreck of a sister ship on the rocky ledges reminds the traveller that the process is not without some danger, and a few miles below reach Ambalema. This is one of the most important tobacco producing centres in Colombia, and, according to the 1912 census, the municipio, founded in 1786, now has a population of 6,500. For many

years the Goschen family, well known through Lord Goschen, who was at one time Chancellor of the Exchequer, and his son, the British Ambassador to Germany, were the principal owners of the largest cigar factory here, but this is now the property of Mr. John M. Vaughan. Mr. William Scruggs, at one time American Minister to Colombia, states that the Spaniards found the Indians growing tobacco at this place, but I have not been able to find confirmation of this assertion. The region has certainly been famous for this product for at least 150 years, and Colonel Hamilton in 1824 passed champans on the river laden with cigars and tobacco from this point. The quality of the yield to-day is said to be inferior to that formerly produced, owing to faulty methods of cultivation, to some fungoid disease of the plant, and to the unsatisfactory nature of the labour available. Ambalema is, however, quite a market centre, and we found the river front piled with pottery which had been floated down on rafts.

Arriving at Beltrán toward noon, we soon started on the train to La Dorada. The road climbs to Mariquita up a plain having a gentle gradient, reminding one of the slope of the apparently flat Magdalena plain, from the river to Ibagué, and of a similar semi-arid, grass-covered character. After a time the railway enters a small valley and then emerges on a little llano of volcanic ash, in the centre of which lies Mariquita not far from the point where the Rio Gualí leaves the mountains. It is the administrative centre of the Dorada railway line, and except for the offices and buildings of the railway company and the residences of its officials, is a decayed old Spanish town of departed glories. Founded, according to Markham, in August, 1551, by Fran-



The waterfront at Ambalema



Pottery rafts and quarters of the merchants

cisco Nuñez Pedroso, the city is stated in most Colombian works of reference to have been moved to its present site six years later. It is situated in a healthy, pleasantly warm climate at an elevation of slightly over 1,500 feet, and formerly, because of the fabulously rich silver mines in the neighbourhood and the deposits of alluvial gold tributary to it, was a city of great wealth and importance. Here there was a mint and notable edifices belonging to the religious orders. Here the Conquistador Quesada spent his last days, and died on the 16th of February, 1579, at the age of 80 years. Eighteen years later his body was removed to the cathedral at Bogotá, where it now rests. Markham records that this was also the residence for seven years, 1783-1790, of the celebrated botanist, Dr. José Celestino Mutis, who amassed here a collection of 24,000 dried plants, and 5,000 drawings of plants, made by his eight pupils. Mutis was the friend and, to some extent, the inspiration of the famous circle of Colombians, including Caldas and Zea, who seemed by their brilliance and patriotism to justify the expectation that Colombia, released from what was considered the incubus of Spain, would develop more rapidly and more broadly than she has.

Mariquita was the centre of an administrative district in the vice-royalty of Santa Fé, and later of a province. It gave the name, in 1831, to one of the provinces of the Republic, roughly co-extensive with the modern Tolima, of which Ibagué was then, as now, the capital. The town was ennobled by Charles V and given a coat-of-arms, but its ancient splendours are now gone.

The eminent Colombian mining engineer, Fortunato Pereira Gamba, records that the production of silver from

the region of Mariquita reached its maximum between 1586 and 1620, and then steadily declined. In 1785 the Viceroy sought to work the most famous of the mines, La Manta and Santa Ana, six miles from Mariquita. Engineers were brought from Spain, but after an expenditure of \$230,000 with a resulting production of silver worth less than \$30,000 the work was abandoned. In 1824 the Government of the Republic entered into a contract with Herring, Graham and Powles of London, for the exploitation of these two mines. This firm in 1830 began work seriously and on a large scale, and after an expenditure of over \$1,000,000 in the next six years for an output of silver worth \$139,000 likewise abandoned the undertaking. These mines have continued to yield negligible quantities of silver, but the most important mine at the present time is that of Frias, re-discovered in 1870, and now profitably worked by the North Tolima Mining Company of London. The production is carried on muleback to the station of San Felipe on the Dorada Railway, between Mariquita and Beltrán.

On our journey to the coast in May Lord Murray and his party were the guests for two days of Mr. Thomas Miller, the Manager of the Dorada Railway, at his delightful home at Mariquita. There we met the engineers engaged on the survey of the aerial tramway to Manizales and also on the projected extension of the railway from Beltrán to a connection with the Girardot Line near Tocaima. The completion of such an extension of the railway—for fortunately the La Dorada and Girardot lines are of the same gauge—would enable goods and passenger trains to run through from Facatativá to La Dorada without change. Such a linking up of lines would perhaps force the change of the

gauge of the Sabana Railway from one metre to one yard and trains could then run from Bogotá to La Dorada at the head of the lower navigation without change. This extension has been discussed for years and various alternative routes surveyed, but one is rather surprised to find the statement in a volume on the Colombian and Venezuelan Republics by William L. Scruggs, published in 1900, that "the railroad from Yeguas to Honda has been recently extended up the left margin of the river to Girardot, and thence across the country to Tocaima," and that "more recently this road has been extended up the Funza valley as far as Anapoima and the project is to extend it by way of the town of La Mesa, zigzag up the mountain side to the western edge of the Plain of Bogotá." As Mr. Scruggs was, for some years, American Minister to Colombia, one would be inclined to accept the statement as a fact, unless he happened to know that the terminus of the Dorada Railway line was in 1900 at Arrancaplumas, that the extension to Beltrán was only opened to traffic in 1907 and that the extension from Beltrán to a connection with the Girardot line is still only a project. Mr. Scruggs has in some way confused the Girardot and the Dorada lines and established a connection between them with trains in operation in 1900!

In our present trip to the coast we met, on the station platform at Mariquita, the engineers engaged in the construction of the aerial railway and they accompanied us on the train to Honda. The ropeway starting at Mariquita at an elevation of 1,500 feet crosses the Central Andes at a height of 12,050 feet, and terminates at 6,760 feet at Manizales, a total distance of forty-six miles. It is said that when completed it will be the longest aerial tramway

in the world by about thirteen miles. Power for its operation is to be secured by a hydro-electric installation at the junction of the Sucio and Gualí rivers designed to yield 1,200 horsepower, but with provision for increasing this to 2,000. The line will secure to the Dorada Railway the traffic from the Manizales region, important both for its coffee plantations and its mines. At present the products of this region go in part to Mariquita, and in part to Cartago, and then to the Cauca Railway and Buenaventura. Between Manizales and both Mariquita and Cartago, the transportation is to-day on the backs of beasts of burden and the relative condition of the roads determines which route is used. Freight can at present be transported from Mariquita to Manizales in six days by mules when the roads are dry, but in wet weather, when oxen are chiefly used, the time is fourteen. The cost is about \$3 for each bag of 140 to 150 pounds. The ropeway will reduce the time to ten hours and the cost to \$1.50. The work is being done for the Dorada Railway Ropeway Extension, Ltd., by Ropeways, Ltd., of London, and the consulting engineers are Sir Douglas Fox and Partners.

From Mariquita the railway descends to Honda and near the town crosses the Gualí River on a steel bridge, which is the object of much local pride and is described by the people and on the picture postcards as "El Gran Puente Pearson," because it occurs on the section of the line between Honda and Beltrán, which was built for the Railway Company in 1905-1907 by S. Pearson and Son, Limited.

Honda was founded in 1560, only a few years after Mariquita. In the early days it was quite dwarfed by its wealthy neighbour, but now, thanks to its healthy, though

hot, location and its position on the river, it is the centre of a population of 8,600, whereas the census of the Mariquita district shows only 4,500 inhabitants. The extension of the railway from Honda to Beltrán has, however, robbed the town of part of its advantages, though it is still the terminus of the reduced traffic on the Honda mule-road. With the connection of the Dorada and the Girardot lines, both Honda and Girardot will decline in importance. Like Mariquita, Honda suffered from earthquakes in 1595, 1687, and 1805, the last of which virtually destroyed the city. Mariquita was the name of an Indian chief whose territory embraced this land at the time of the conquest, while Honda is the Spanish word for "depth" or "bottom."

At La Dorada, which we reached at five o'clock on Saturday, the 29th of November, we found the steamboat "Santander" all ready for the trip down the river, and the water being high, she cast off at 8 o'clock and reached Puerto Berrío at 9 o'clock the next morning. Seldom do the boats attempt to navigate this portion of the river at night, only when the stream is in flood, as at present, is such a thing done, and then only by the boats going down stream. Below Puerto Berrío the vegetation is so dense and the river so near the centre of the depression between the two chains, that there is little of scenic interest for some time. This is a section almost without people, occasionally there is a squalid palm-thatched hut on the bank, more rarely a corrugated iron-roofed bodega or warehouse built for the accommodation of the people living in the healthy uplands beyond the wet lands of the valley.

Toward noon on Sunday, the 30th, we passed the mouth of the Opón, important in Colombian history, because it

was here that Quesada left the Magdalena in 1536 on the journey which resulted in the conquest of the land of the Chibchas. A few miles below, at the mouth of the Colorado, a projection of low terrace land touches the river, and it was here that Quesada's resolute will triumphed over the dissent of his several hundred companions. His party, which had left Santa Marta on the 6th of April, 1536, had struggled for months through a new and tropical region, part of the expedition in boats, but the greater part on the bank, chopping its way through the tropical jungle. After the expedition had entered this Paturia region, the difficulties had increased enormously, many had perished, many more were sick, and the oldest of the leaders were deputed by the men to approach Quesada with the recommendation that the attempt be abandoned and the expedition return to Santa Marta. Quesada would have none of this, and reproached the men with cowardice and disloyalty. Resting his men here, he sent Captain San Martín with twelve men in three canoes to reconnoitre. They turned into the Opón and on the second day captured a canoe containing finely woven clothes and quantities of pure white salt moulded into loaves. Beyond, he found a store-house filled with the same salt, for this was one of the Chibcha trade routes, and higher up he reached cultivated fields. On San Martín's return with this cheering news, Quesada selected 200 of his best men and arranged for the return down the river of the sick and wounded on boats and rafts. He had left Santa Marta with an expedition of 800 men and 100 horses, and his losses to the mouth of the Opón had been very heavy. Of the band that continued with him up the

river Opón, 166 men and 59 horses survived when he reached the land of the Chibchas.

Late Sunday afternoon (November 30th), we passed Puerto Wilches, where there are a few frame houses built in connection with the attempt to join this point on the river with Bucaramanga by railway. The original project was started by General Solan Wilches more than twenty-five years ago and various unsuccessful attempts have been made from time to time to carry the project through. Mr. Albert Millican, who visited this locality in 1890, says in his "Adventures of an Orchid Hunter," that he found here "in this forest wilderness several railway wagons and about one thousand steel rails, all in a pitiful state of wreck and dilapidation." Petre says in 1904, "a few rails running eastward are all that remain of this abandoned enterprise which never got very far, and is now completely overgrown." Since then another attempt has been made and the road has advanced to a point about twelve miles from the river, but as most of the timber used for ties was of a sap-wood type this portion of the track will have to be relaid before it can be used.

Early the next morning (December 1st) we reached Bodega Central, a collection of palm-thatched huts and sheet iron warehouses on low ground almost covered by the river at its present stage. This is the river port for the Bucaramanga region which is reached from here only by the Lebrija and Sogamoso rivers and the connecting mule-trails. Below Bodega Central settlements become more numerous, and, as the vegetation begins to thin, we get occasional charming glimpses of the blue Eastern Andes. Toward noon we reach Banco, picturesquely situated on the

top of a low terrace at the mouth of the Cesar and well above ordinary highwater. Turning into the narrow and tortuous Loba channel, the boat finally enters the wider river below the mouth of the Cauca, reaches Magangué at sundown and continuing through the night, arrives at Calamar, a smaller, though neater and more attractive town, early the next morning (December 2nd).

In coming to the coast from Bogotá in May, we left the steamboat at Calamar and went 65 miles by train to Cartagena. This line, which has a gauge of one yard, was completed on the 1st of August, 1894. From Calamar, it runs over low rolling hills and crosses the Dique near Arenal, about twenty miles from the river port. Along the Dique and about midway between Arenal and the sea, is the sugar plantation of Sincerin, an enterprise which was initiated in 1907 and is stated now to give employment to 5,000 people. The capacity of its mill and factory, which is the largest in Colombia, is given as about twenty tons per day. Twenty-seven miles of light railway have been constructed for the transportation of the cane, and the enterprise has two steamers operating along the Dique to Cartagena.

Beyond Arenal the Cartagena railway begins the climb of the Tierradentro and, reaching its summit near Turbaco, runs down to Cartagena, the most picturesque and the most historic old Spanish city in Colombia. "Cartagena of the Indies"—"Cartagena the Queen of the Seas" of the days of the Spanish rule, one of the headquarters of the Inquisition in South America, and a city of such wealth that it was frequently attacked by the buccaneers, both English and French, and whose defence was so important that, by the



Bodega Central during a high stage of the river



Banco

ON THE MAGDALENA

order of Philip the Second, the town was surrounded by a great wall at a cost of many millions—Reclus even gives the figure as sixty million dollars—so massive and so well-constructed that the tourist of to-day is driven along a part of its top in an automobile. The "Heroic City" was its proud title in the War of the Independence, but with the changes brought about by this struggle, the city began to decline and it is perhaps due to this that it owes the preservation of its ancient atmosphere. Founded on the 20th of January, 1533, by Pedro de Heredia on the magnificent harbour discovered by Bastidas, in March, 1501, and where in 1510 an attempt to establish a settlement was unsuccessful through the resistance of the Indians, the town first received the Indian name of Calamar, which was soon changed to Cartagena, because of a supposed resemblance between its harbour and the Spanish seaport. The bay of the Colombian Cartagena, with an area of 62.5 square miles and an average depth of 75 to 100 feet, is one of the most wonderful natural harbours in the world and with slight improvements could be made one of the most perfect. Such an asset does this bay form that the city of the future on the shores of the Bay of Cartagena will surpass even the glories of the Cartagena of the past.

There are numerous points on the northern shores of Colombia which have claims that will have to be considered in connection with the establishment of the terminus of any trunk railway system, and the wonderful harbour of Cartagena will give her a very strong position among her competitors. The physical characteristics of the country require two main trunk railways, an eastern and a western, and from these stems branches will naturally grow. The west-

ern line would extend from the coast along one side or the other of the grazing and agricultural lands of the Montañas de María to the Cauca River near the mouth of the Nechí and then either along the valley of the Nechí and Porce to Medellín and thence to the Cauca, or along the Cauca itself with a branch line to Medellín. Under either alternative the line would continue southward through the valley between the Central and Western Andes to a connection with the Buenaventura line and on to Pasto and the border, connecting there with a line to Quito. Such a line would, for only about fifty or sixty miles near the mouth of the Nechí, traverse a region where the tropical rainfall is sufficient to seriously retard development. The eastern line would start from the Caribbean coast, preferably from the same point as the western, in order that there might be easy interchange of products between the important parts of Colombia. It would extend across the lower end of the Cesar valley, would skirt the healthful mountain area along the edge of the Paturia region to Bucaramanga and then follow one of the two evident valley routes to Bogotá and extend to the south into the upper Magdalena valley and possibly across the adjacent low part of the Eastern Andes to one of the readily navigable waterways of the Amazon system.

A few miles from Turbaco, on the Cartagena Railway, is a group of mud-volcanoes which discharge gas with a little oil, and toward Barranquilla there are other similar manifestations, and in this Tierradentro region over half a million dollars has been spent in the last few years in unsuccessful efforts to find commercial deposits of petroleum. However, the oil possibilities of Colombia have as yet only

been scratched, and careful systematic work should yield commercial results.

Continuing from Calamar down the river on the 2nd of December, we reached Barranquilla in six hours. We passed many floating masses of the beautiful water hyacinth, which has proved such a curse to navigation in some of the streams and channels in the southern United States. We saw very little of this plant in the Magdalena above the mouth of the Cauca, but found that the latter stream was pouring out considerable masses, and those observed floating down the river below Calamar probably came from the Cauca.

Owing to the flood stage of the river, we saw no alligators on this journey, but on former trips they were observed occasionally along the shores and on the sand-bars sometimes half a dozen together, each six to twelve feet long. Attention is usually attracted to them by some observant passenger shouting "Caimán! Caimán!" and they are not so common but that there is usually a rush of the travellers to that side of the boat. These animals are commonest to-day between Puerto Berrío and Banco in the thinly settled Paturia region, but we saw several small ones above the Falls of Honda. As on the rivers in the southern United States, they have been hunted for their skins, but it will be long before they will entirely disappear in the Paturia region of Colombia.

From Calamar to Barranquilla along the river is, according to the calculations of Vergara, a distance of 50 miles—the mouth of the river is 11 miles beyond. Barranquilla, originating as a settlement on the first high land above the mouth of the river, which small ocean-going boats could

reach by crossing the Magdalena bar, is of importance to-day as the terminus on the river of the railway which connects with modern ocean-going steamers by means of the pier at Puerto Colombia, 17 miles away. Before the War of the Independence Barranquilla was as nothing compared with Cartagena, but since that time the relative importance of the two places has changed. In 1912, the exports and imports through Barranquilla totalled \$24,500,000, while those through Cartagena were \$11,500,000, and the population of Barranquilla was 48,900 and of Cartagena 36,630.

Barranquilla is the most modern and most progressive town in Colombia to-day. The port for Barranquilla was for a time Sabanilla, but this so filled with silt from the river that it became useless, and a pier was constructed a little farther west. A new pier was built in 1893, having a length of 4,000 feet, and reaching a depth of water of 23 to 26 feet. It has very little protection, and steamers must, under certain storm conditions, leave the pier and run for the open sea. There is also danger that this port will share the same fate as its predecessor at Sabanilla, for the drift of the Magdalena sediment is in this direction. We spent three very pleasant days at Barranquilla and in the evenings enjoyed motor rides on the good roads about the city. At the "Pension Inglesa," one of the hotels of the city, the patio is filled with beautiful plants—in the centre is a fountain and half a dozen tame egrets stalk around in stately fashion. At noon on the 6th we entered the train and in an hour and a half reached Puerto Colombia and boarded the steamer.

And so we leave Colombia, with much gratitude for the unfailing courtesy shown us, with much sympathetic regard for her problems, and with the warmest feelings toward the country and her people.

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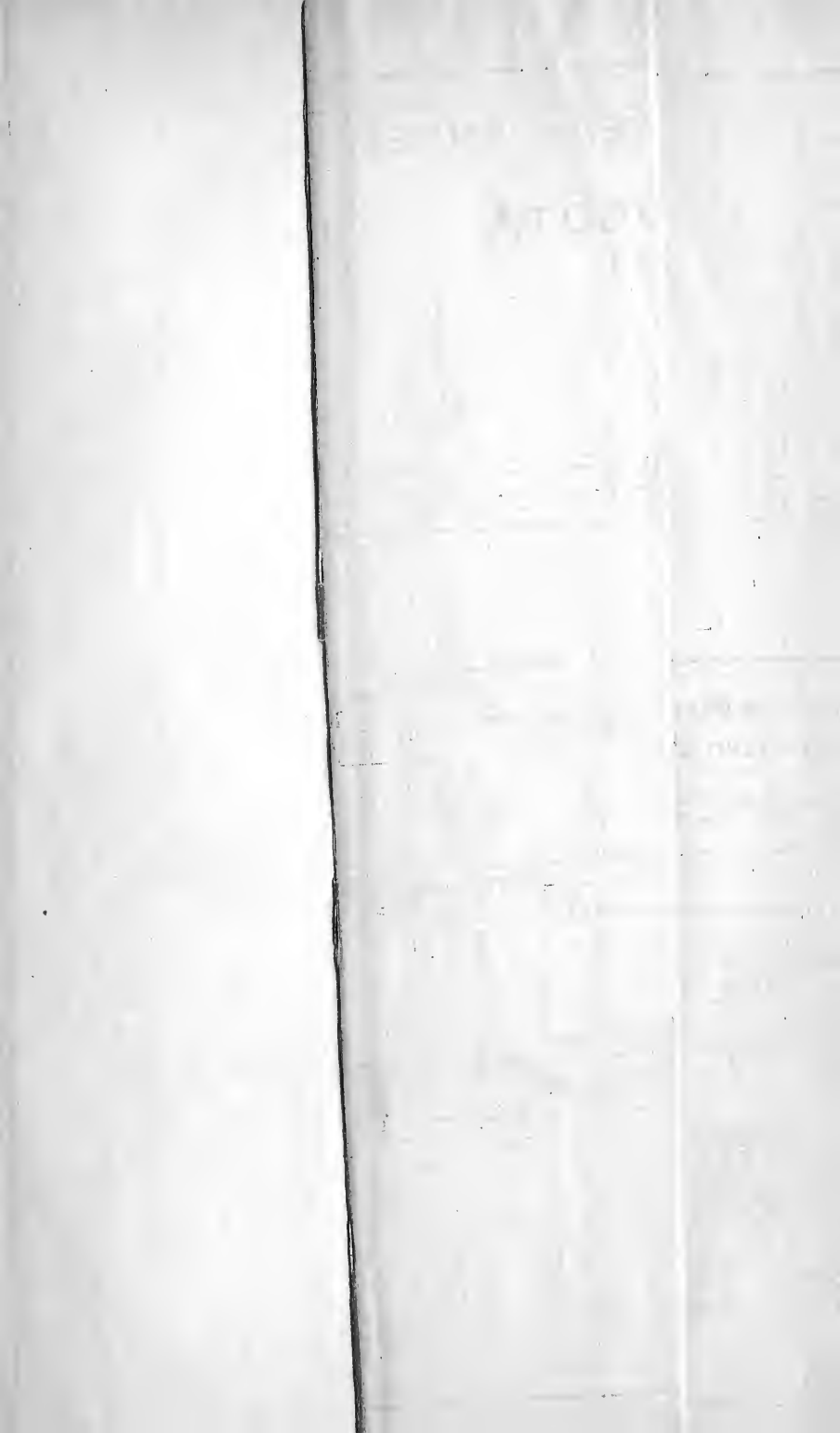
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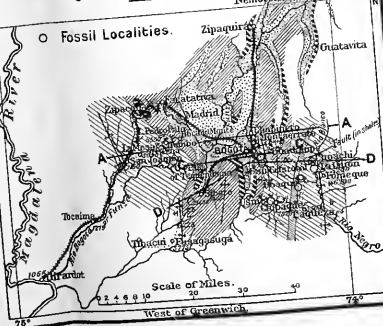
STRUCTURE OF THE EASTERN ANDES IN THE REGION OF BOGOTÁ.

A.C. VEATCH. NOV^R 1913.

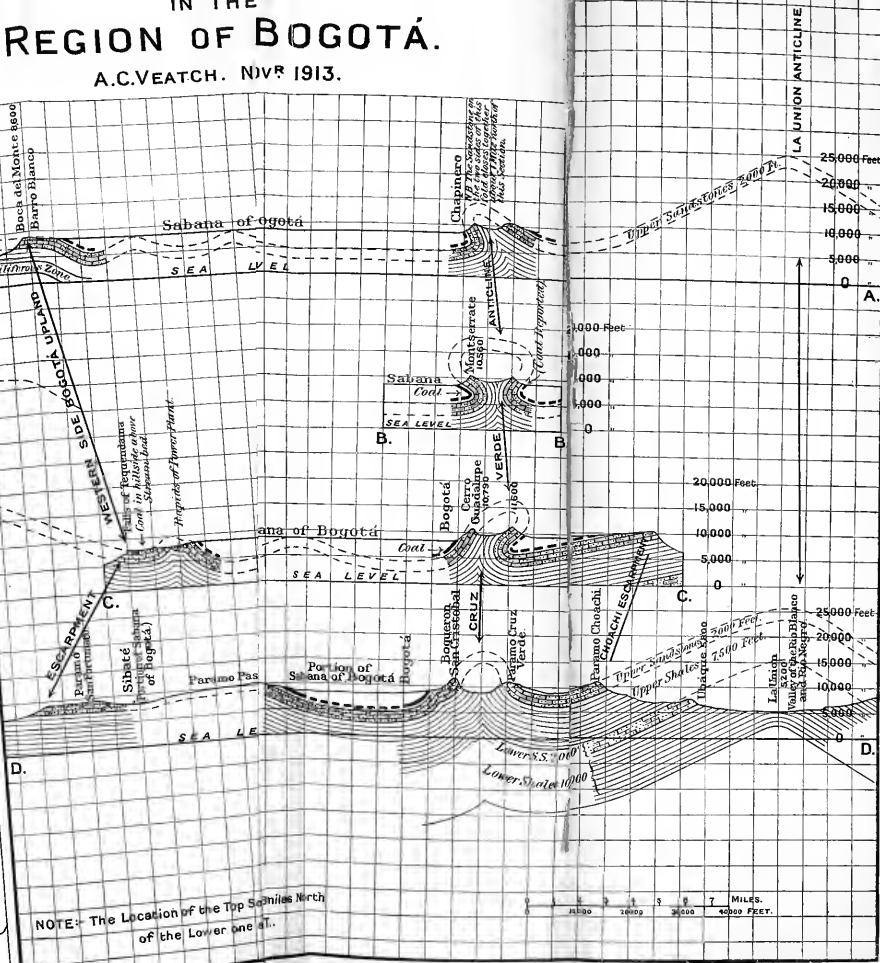
SKETCH MAP OF GEOLOGY AROUND BOGOTÁ.

- Alluvium of the "Sabana" of BOGOTÁ.
(Mean Elevation 8550 Feet.)
- Coal Bearing Beds. (Probably in part above
and in part within the Upper Sandstones.)
- Upper Sandstones 2,000 Feet
- Shales with Lower (7500 Upper Shales
2000 Lower Sandstones)
Sandstones Member in
Region East of Bogotá (10000 Lower Shales)

○ Fossil Localities.

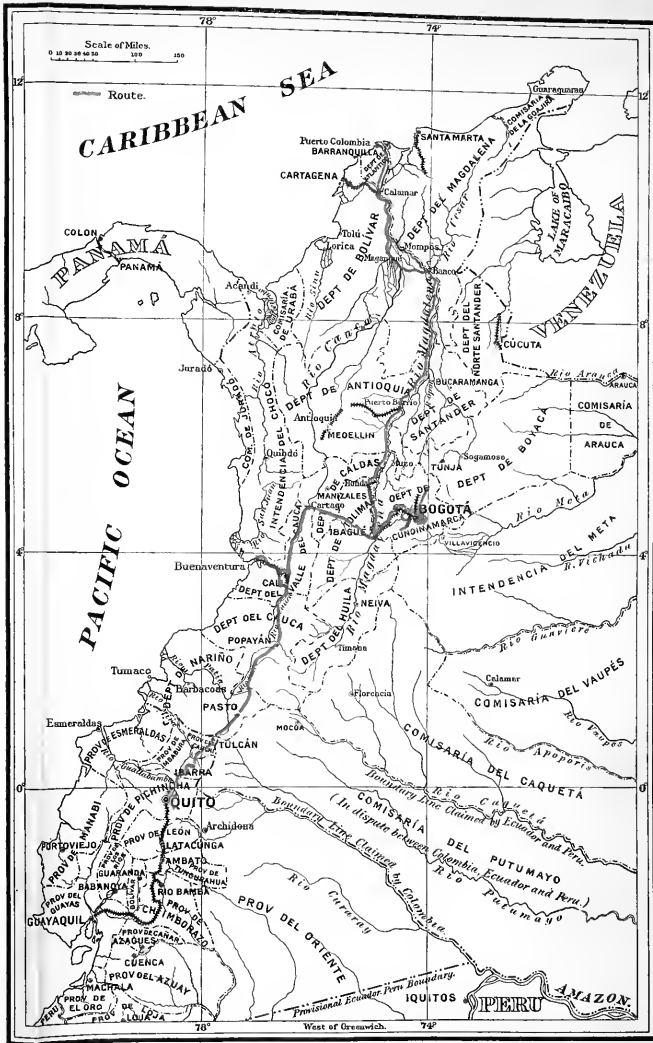


NOTE: The Location of the Top Salinas North
of the Lower one is.

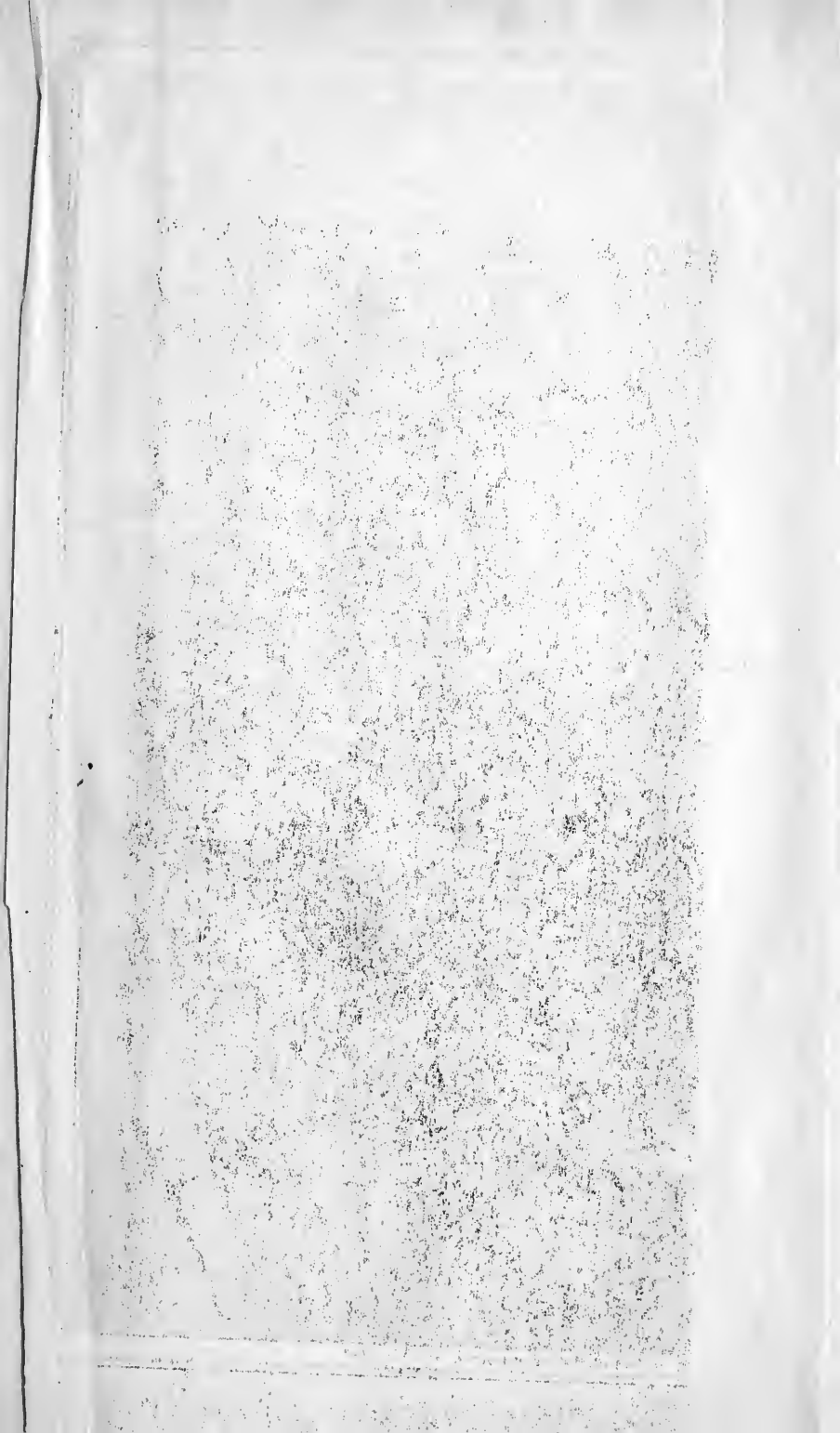


OUTLINE MAP OF COLOMBIA AND ECUADOR

Note.—So far as could be determined, the political divisions shown for Colombia are correct for 1st January, 1914. Since that time the Intendencia del Chocó, the Comisaría de Juradó and the Comisaría de Urabá have been abolished and the Provinces of Atrato and San Juan created in their stead. The new provinces cover the drainage basins of the rivers whose names they bear, with the addition to San Juan of the lower part of the Baudó and to Atrato of the Comisaría de Juradó.



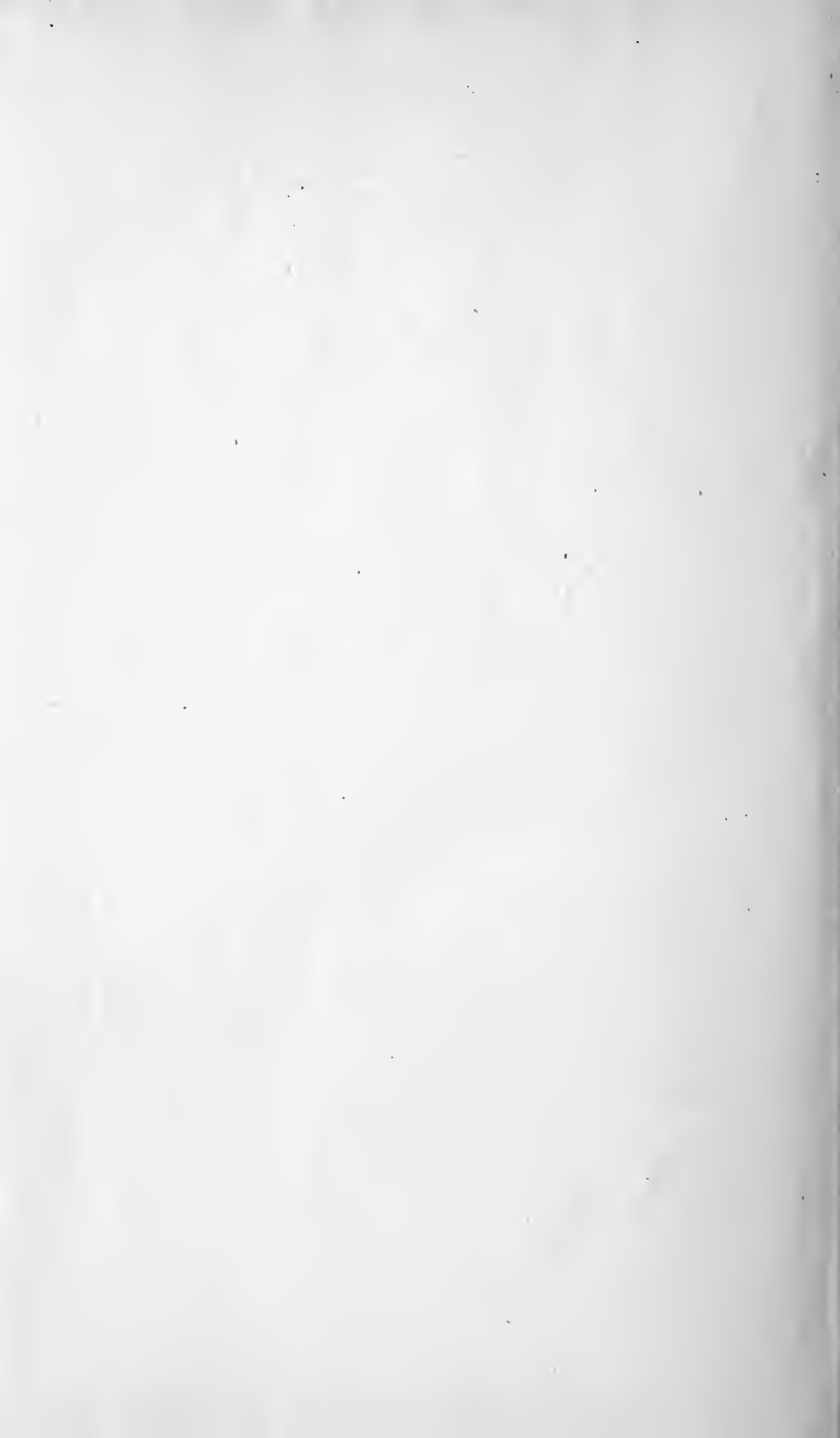




PHYSICAL FEATURES OF COLOMBIA
Based on a relief model by the Colombian artist, Sr. José Miguel Rosales.

Based on a relief model by the Colombian artist, Sr. José Miguel Rosales.





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